

RECORD OF DECISION AMENDMENT
Mattiace Petrochemical Co., Inc., Superfund Site
Nassau County, New York



United States Environmental Protection Agency
Region II
New York, New York
September 2014

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Mattiace Petrochemical Co., Inc., Superfund Site, Nassau County, New York

Superfund Site Identification Number: NYD000512459

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) Amendment documents the U.S. Environmental Protection Agency's selection of a change in the groundwater and soil gas remedy which was selected for the Mattiace Petrochemical Co., Inc., Superfund Site in 1991 (1991 ROD). The original remedy was, and this ROD Amendment is, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601 - 9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document explains the factual and legal basis for selecting a remedy to address the contaminated groundwater and soil gas at the Site. The attached index (See Appendix III) identifies the items that comprise the Administrative Record, upon which the selected amended remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the planned remedy in accordance with Section 121(f) of CERCLA, 42 U.S.C. § 9621(f), and NYSDEC concurs with the amended remedy (see Appendix IV for the NYSDEC Concurrence letter).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD Amendment, may present an imminent and substantial endangerment to public health or welfare or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy includes the following key components:

- Discontinuance of the operation of the existing groundwater pump and treat system;
- Bioventing the residual source of contamination to groundwater, which consists of both free-phase light non-aqueous phase liquid (LNAPL) and LNAPL in the smear zone (near the water table) on the former Mattiace facility Property and extending west-northwest onto the Nassau County Garvies Point Preserve property (Preserve). This remedy component will require the installation of new horizontal bioventing wells that would be connected to the existing vapor treatment system;
- *In-situ* thermal treatment of contaminated soil and nearby groundwater in "hot spot" areas of known elevated soil and groundwater contamination on the former Mattiace facility Property;
- Enhanced reductive bioremediation, whereby enhancements will be injected into vertical injection wells, in areas of the former Mattiace facility Property where thermal treatment does

not address contamination and in the Preserve areas where elevated concentrations of volatile organic compounds (VOCs) have been detected in groundwater;

- Installation of a partial vertical containment barrier (e.g. slurry wall and/or sheet pile wall) along the former Mattiace facility Property line, with the exception of the area north and west, where the depth to the underlying clay layer deepens and where non-aqueous phase liquid (NAPL) is present;
- Hydraulic control, via phytoremediation, to address the potential increase in water levels on the southern portion of the former Mattiace facility Property behind the partial vertical containment barrier;
- Performance monitoring of groundwater to evaluate the effects of active remedial components on natural attenuation processes, to determine if contaminant migration is controlled, to monitor changes in the VOC contaminants over time, and to ensure the remedial action objectives (RAOs) are achieved;
- Implementation of institutional controls (ICs) that will include the establishment of an environmental easement/restrictive covenants to be filed in the property records of Nassau County until such time that RAOs are attained. The ICs will: prevent inappropriate withdrawals of groundwater; require evaluation of the need for vapor barriers and vapor intrusion systems for any future buildings that may be constructed on the former Mattiace facility Property; and prevent activities or uses of the property that might interfere with any of the treatment systems (including the barrier wall) that are in place at the Site;
- Development of a Site Management Plan (SMP) to ensure the effectiveness of the engineering and institutional controls, as well as the long-term performance of the active treatment components through groundwater monitoring, periodic reviews and certifications; and
- Development of a restoration plan for the Preserve.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy 13. This will include consideration of green remediation technologies and practices that are consistent with the CERCLA selected remedy.

While it is anticipated that this alternative will ultimately result in reduction of contaminant levels in groundwater to levels that would allow for unlimited use and unrestricted exposure, it is also anticipated that it will take longer than five years to achieve these levels. As a result, in accordance with CERCLA, the remedy as amended by this ROD Amendment will be reviewed at least once every five years until such a time as performance standards are met and there is no longer a risk to human health and the environment with unlimited use and unrestricted exposure.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1- Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, because as implemented it will meet the following requirements: 1) it is protective of human health and the environment; 2) it meets a level of standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under the federal and State laws; 3) it is cost-effective; and 4)

it utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Part 2- Statutory Preference for Treatment

The selected remedy meets the statutory preference for the use of remedies that involve treatment as a principal element. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the contaminated soil gas and groundwater will be treated as part of the selected remedy. Data from a source-area investigation revealed locations which are acting as large NAPL source areas. These source areas, which are a significant reservoir for the migration of contamination to groundwater (and therefore constitute a “principal threat waste”), will be treated by the selected remedy.

Part 3- Five-Year Review Requirements

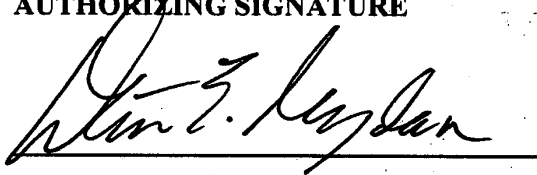
Once implemented, this remedy as amended will not result in hazardous substances, pollutants, or contaminants remaining at the Mattiace Petrochemical Co., Inc. Site above levels that would allow for unlimited use and unrestricted exposure. However, because it is anticipated that it may take more than five years to attain the cleanup levels, pursuant to Section 121(c) of CERCLA, reviews will be conducted at least every five years after the completion of construction to ensure that the remedy is, or will be, protective of human health and environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD Amendment. Additional information can be found in the Administrative Record file located in the information repository.

- Chemicals of concern may be found in the “Site Characteristics” section;
- Potential adverse effects associated with exposure to Site contaminants may be found in the “Summary of Site Risks” section;
- A discussion of cleanup levels for chemicals of concern may be found in the “RAOs” section.
- A discussion of principal threat waste is contained on page 37 in the “Principal Threat Waste” section;
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of the groundwater used in the baseline risk assessment are discussed in the “Land and Resource Use” section;
- Potential groundwater use that will be available at the Site as a result of the selected remedy is discussed in the “RAOs” section;
- Estimated capital, operation and maintenance (O&M), and total present-worth costs and the number of years over which the remedy cost estimates are projected are discussed in the “Comparative Analysis of Alternatives” section; and
- Key factors that led to selecting the amended remedy (i.e., how the selected remedy as amended provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting those criteria key to the decisions) may be found in the “Comparative Analysis of Alternatives” section and in the “Statutory Determinations” section.

AUTHORIZING SIGNATURE

A handwritten signature in black ink, appearing to read "Walter E. Mugdan", is written over a horizontal line.

Walter E. Mugdan, Director
Emergency and Remedial Response Division
EPA - Region II

September 29, 2014

Date

DECISION SUMMARY

Mattiace Petrochemical Co., Inc., Superfund Site

Nassau County, New York



United States Environmental Protection Agency
Region II
New York, New York
September 2014

TABLE OF CONTENTS

SITE NAME, LOCATION, AND DESCRIPTION	1
SITE HISTORY AND ENFORCEMENT ACTIVITIES	1
HIGHLIGHTS OF COMMUNITY PARTICIPATION	4
SCOPE AND ROLE OF THE RESPONSE ACTION	5
SUMMARY OF SITE CHARACTERISTICS	5
LAND AND RESOURCE USE	13
SUMMARY OF SITE RISKS	13
REMEDIAL ACTION OBJECTIVES	24
SUMMARY OF REMEDIAL ALTERNATIVES	25
DESCRIPTION OF ALTERNATIVES	25
COMPARATIVE ANALYSIS OF ALTERNATIVES	32
PRINCIPAL THREAT WASTE	37
AMENDED REMEDY	38
STATUTORY DETERMINATIONS	43
DOCUMENTATION OF SIGNIFICANT CHANGES	44
APPENDIX I	FIGURES
APPENDIX II	TABLES
APPENDIX III	ADMINISTRATIVE RECORD INDEX
APPENDIX IV	STATE LETTER OF CONCURRENCE
APPENDIX V	RESPONSIVENESS SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

The Mattiace Petrochemical Co., Inc., Site (Site) includes the former Mattiace facility Property and a groundwater plume, located in Glen Cove, Nassau County, New York. Groundwater contaminated with volatile organic compounds (VOCs) extends from the former Mattiace facility Property to the northwest, a distance of approximately of 700 feet. The Superfund Site Identification Number is NYD000512459. The Environmental Protection Agency (EPA) is the lead agency for the Site, with the support of New York State Department of Environmental Conservation (NYSDEC).

The Site is located in the City of Glen Cove which is located on the north shore of Long Island. Glen Cove is approximately 20 square miles in area and has a population of 26,964 (U.S. Census 2010). A Site location map is provided as Figure 1 in Appendix I.

The immediate area in the vicinity of the Site includes light industry, commercial businesses, a sewage treatment plant, a County public works facility, and State and Federally-designated hazardous waste sites and Brownfields properties. Other land uses in the vicinity include marinas, yacht clubs, public beaches, and the Nassau County Garvies Point Preserve (the Preserve). There are also residences located just over 400 feet north of the former Mattiace Property.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

From colonial times through the 19th century, clay mining was performed in the vicinity of the Site, which most likely significantly altered the natural geology of the area. An analysis of historic aerial photographs indicates that the Site was not developed for industrial purposes prior to 1953. Between 1953 and 1966 significant excavation and backfilling activities were conducted in the area in the vicinity of the Site for industrial development.

The Mattiace Petrochemical Company began operating at its facility located on Garvies Point Road in the mid-1960s (referred to as the “former Mattiace Property” or the “Property”), receiving chemicals by tank truck, blending then redistributing them to its customers. The primary operations were the storing, blending, and repackaging of organic solvents. These solvents were stored in aboveground and underground storage tanks (ASTs and USTs, respectively), and were blended and repackaged in 55-gallon drums under a covered section of the concrete loading dock located in the northeast corner of the former Mattiace Property. The 55-gallon drums were stacked and temporarily stored on the loading dock prior to shipment to various buyers.

A metal Quonset hut, which was located in the western portion of the former Mattiace Property, was used by M and M Drum Cleaning Company to clean, pressure test, and repaint drums. The M and M Drum Cleaning Company and the Mattiace Petrochemical Company were both owned by Mattiace Industries. Aqueous solvent mixtures accumulated during the two Companies’ operations were collected in a wetwell outside the southeast corner of the Quonset hut. The liquids in this wetwell were periodically discharged to one of the adjacent ASTs or into a leaching pool on the former Mattiace Property.

Thirty-two USTs and 24 ASTs were located in the northeastern section of the former Mattiace Property for the storage of organic solvents. The USTs were interconnected as part of a spill prevention system. Excess material from overfilled tanks drained through a series of four concrete manholes and discharged into the solvent/stormwater separator, located in the southeast corner of the Property. This spill prevention system also acted as a stormwater collection system.

In 1986, the Mattiace Petrochemical Company filed for bankruptcy as a result of what is believed to be legal problems resulting from its non-compliance with various environmental regulations. In 1987, at the request of the State of New York, the bankruptcy court removed the protection of assets normally extended to a reorganizing company in order to ensure that the company ceased operations. Meanwhile, in August 1988, a jury returned felony charges against the company and its President for violations of State environmental laws. On July 8, 1988, the EPA notified the two Mattiace brothers, Louis and Otto, who owned and operated Mattiace Industries, of their status as potentially responsible parties (PRPs) at the Mattiace Site, as well as provided them the opportunity to remediate the Site through an EPA consent order. No offer was received by the EPA in response to this notification. In August, 1988, a Federal lien was placed on the former Mattiace Property by the EPA.

In February 1988, the EPA implemented a removal action which included waste characterization and the eventual removal of approximately 100,000 gallons of hazardous materials stored in drums, USTs, and ASTs at the Site.

The EPA added the Site to the Superfund National Priorities List (NPL) on March 30, 1989.

The EPA initiated a second removal action in 1990, consisting of the removal of a collapsed retaining wall along the western property boundary of the Property, with subsequent regrading and replacement with a lower retaining wall.

The EPA also began a Site-wide remedial investigation/feasibility study (RI/FS) in October 1989. Concurrently, the EPA initiated a focused feasibility study (FFS) in December 1989 to evaluate remedial alternatives for a cache of drums buried along the western boundary of the Property. The 1989 RI identified soil and groundwater contamination at the Property and sediment contamination in nearby Glen Cove Creek. Soil contamination was extensive across the entire Property, with hot spots of contamination occurring in several locations. These hot spots were generally associated with USTs, leaching pools, and chemical transfer locations on the Property. Site contaminants identified consisted mainly of VOCs including tetrachloroethylene (PCE) and its breakdown products, and xylenes. The groundwater contamination attributable to the Site was found to be particularly severe, and it included localized layers of light non-aqueous phase liquids (LNAPLs) under the Site, usually consisting of a mixture of organic chemicals like xylene, trichloroethylene (TCE), PCE and toluene.

The EPA issued a ROD in September 1990 (1990 ROD) requiring the excavation and off-Site disposal of buried drums found at the Site. The EPA issued a second ROD in June 1991 (1991 ROD), selecting a comprehensive remedy to address the remaining soil and groundwater contamination at the Site. The EPA determined that the actual or threatened releases of hazardous substances from the Site, if not addressed by the two selected remedies, could present a current or

potential threat to human health and the environment through inhalation of particulates and/or vapors from contaminated soils, dermal absorption of contaminated soils, and ingestion, inhalation, or dermal absorption of contaminated groundwater (based on a potential future residential land use scenario).

The 1990 ROD selected the following remedial action for the Site:

- Excavation, bulking/overpacking and off-site disposal of drums and contaminated soils.

The 1991 ROD selected the following remedial actions for the Site:

- *in-situ* vacuum extraction of VOCs from soil in the general Site area;
- excavation of pesticide hot spots with off-site treatment and disposal;
- demolition, removal, and landfill disposal of Site structures, above-and below-ground storage tanks, and concrete and asphalt debris;
- groundwater extraction and treatment via air stripping and carbon adsorption, followed by reinjection into the groundwater; and
- monitoring of groundwater in the area of the Site, as well as surface water and sediments in Glen Cove Creek.

The cleanup work required by the 1990 and 1991 RODs were organized into six Operable Units (OUs) to facilitate implementation, as follows:

- OU 1 -Excavation of pesticide hot spot
- OU 2 -Excavation and off-site disposal of drums and contaminated soils
- OU 3 -Extraction/treatment/reinjection of contaminated groundwater
- OU 4 -*In-situ* vapor extraction of residually contaminated soil
- OU 5 -Demolition and disposal of existing Site structures, including ASTs and USTs; and
- OU 6 -Pumping/disposal of floating product layer (LNAPL).

The EPA commenced the performance of the work as set out in OUs 1-6. The remedial action objectives (RAOs) set forth in the two RODs have been achieved for OUs 1, 2 and 5 but have not yet been attained for OUs 3, 4, and 6. All capital construction for OUs 3, 4, and 6 has been completed, and the associated treatment systems continue to operate to address contaminated groundwater and soil. Fencing, signs, and other measures have been installed at the Site to minimize potential exposures while remedial activities are ongoing.

In July 2003, pursuant to a consent decree (CD) executed among the EPA and numerous PRPs, TRC Environmental (TRC) assumed operation and maintenance of the OUs 3 and 4 treatment systems from the EPA. Since 2003, TRC has continued the remedial activities associated with OUs 3 and 4. TRC has implemented several changes to the remedy in an attempt to optimize treatment facility performance. The EPA also performed soil vapor intrusion and related groundwater investigations in close proximity to the Site to determine if potential exists for vapors from contaminants in the groundwater to migrate through soils into buildings located above the groundwater. Soil vapor intrusion testing was performed for Janet Lane residences in 2007 and nearby commercial structures in 2007 and 2008. Residential vapor intrusion testing results indicated that sub-slab vapors were within the EPA's guidelines, and that no further action was required to address that potential concern for the Janet Lane residences. The results of the VI

investigation will be discussed in a subsequent document after further investigation of groundwater south of the Property.

The treatment facility for OUs 3 and 4 has been fully operational since September 1999 and has removed an estimated 10,000 pounds of VOCs from groundwater and soil since that time. In the 1991 ROD the EPA estimated that the soil vapor extraction and treatment component of the integrated treatment facility would take four to six years to reach soil cleanup criteria. However, the system has been operating for over 14 years, and soil cleanup objectives have not been met and do not appear likely to be met in the foreseeable future. The groundwater extraction and treatment component of the remedy was anticipated to take approximately 30 years to achieve the cleanup criteria specified in the ROD. However, the data suggests that this goal is not likely to be achievable within that timeframe. TRC has also been hand bailing accumulated LNAPL in select wells over the past few years. The purpose of this document, therefore, is to amend to the OU3, OU4 and OU6 portions of the 1991 ROD and identify a new approach to address the contamination remaining at the Site, as discussed in more detail below.

Because the soil cleanup levels have not been reached and the groundwater cleanup levels are not likely to be achieved within the estimated 30-year timeframe, TRC performed a supplemental RI (SRI) beginning in September 2011. The SRI included investigations to determine (a) the nature and extent of an LNAPL plume of contamination northwest of the former Mattiace Property, (b) the extent and direction of migration of the contaminants of concern (COCs) in groundwater north and west of the former Mattiace Property, (c) the source of the COCs detected in groundwater monitoring wells MW-01 and MW-4S located south and southeast, respectively, of the former Mattiace Property, and (d) the current concentrations of COCs in migration pathways at the Site to evaluate current Site risks. The media of concern at the Site are groundwater and soil gas. Soil was excluded as an incomplete pathway because of previous excavation that occurred during OU2 remediation. Additionally, subsurface soil exposures were below the risk range for all of the receptors.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

On April 17, 2014, EPA released the Proposed Plan for the amendment of the cleanup of the Site to the public for comment. The EPA made supporting documentation comprising the administrative record available to the public at the information repositories maintained at the Glen Cove Public Library in Glen Cove, New York and the EPA Region II Office in New York City. The notice of a public comment period and the availability of the above-referenced documents were published in the *Glen Cove Record Pilot* on April 17, 2014. The public comment period was 30 days and ended on May 19, 2014. On April 28, 2014, EPA held a public meeting at the Glen Cove Town Hall to inform officials and interested citizens about the Superfund process, to present the Proposed Plan for an amendment to certain portions of the remedy for the Site, including the preferred remedial alternatives, and to respond to questions and comments from the attendees. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary. (See Appendix V)

SCOPE AND ROLE OF THE RESPONSE ACTION

This ROD Amendment addresses groundwater and soil gas contamination on the former Mattiace Property and on the areas to the north and west of the Property. See Figure 17. This ROD Amendment amends portions of the 1991 ROD remedy for OU1 (more specifically, subsequent components OUs 3, 4, and 6) to address on-Property contamination and a portion of the plume that has migrated away from the property toward the northwest. The major source of the groundwater and soil gas contamination at the Site is the LNAPL plume, which was not fully characterized at the time of the 1991 ROD. The EPA has concluded that the current remedial action to address OUs 3, 4, and 6 are unlikely to achieve the RAOs of the 1991 ROD in a reasonable timeframe or address this newly identified LNAPL plume, leading the EPA to issue this ROD Amendment.

The 1991 ROD addressed surface soils (within the first two feet of ground surface) at the Site, and they are no longer a media of concern. Cleanup levels have been achieved for surface soil. This action addresses subsurface soils, as discussed in more detail, below.

Further investigation and evaluation of groundwater contamination and its potential sources south of the former Mattiace Property associated with monitoring wells MW-01 and MW-4S will be performed in the future. Results of this investigation are likely to lead to an additional OU and corresponding ROD, which would be expected to be the final action at the Site.

SUMMARY OF SITE CHARACTERISTICS

TRC collected environmental data during the SRI and other sampling efforts in order to determine Site characteristics as well as gain information to perform a risk assessment. RI-related sampling of groundwater and soil at the Site was conducted in several phases from 2011 to 2013. The area addressed in this ROD Amendment is the impacted area on the former Mattiace Property and the LNAPL and groundwater plume that extends approximately 700 feet to the north and west, under the Preserve.

Site Topography, Geology and Hydrogeology

The Preserve consists of 62 acres of glacial moraine covered by forests, thickets, and meadows. There are about five miles of marked nature trails. Wooded areas, which exhibit various stages of ecological succession, contain over sixty (60) species of trees as well as numerous shrubs, vines and wildflowers. High cliffs along the shoreline display erosional features such as alluvial fans, talus slopes, and slumping caused by ancient multicolored clays oozing from the bluff. Life forms typical of the north shore of Long Island are abundant along the rocky shoreline. The woods and meadows, with their varied plant life, attract more than 140 species of birds, notably, scarlet tanagers and many varieties of warblers. Woodchucks, opossums and raccoons can occasionally be seen in the woods or along a meadow's edge.

The topography of the former Mattiace Property was modified in the past by a series of retaining walls in order to achieve a relatively flat surface with a slight slope downward toward the south. The Property is bordered on the north by a steep wooded hillside that rises more than 30 feet above

the Property. Near the western boundary of the Property, a concrete retaining wall separates the access road to the Property from the adjacent 20-30 Garvies Point Road property's parking lot, approximately 20 feet below the Property. Along the southern boundary, a retaining wall is used to raise the elevation of the Property more than 10 feet relative to the apparent natural grade of the area. Along the eastern Property boundary, ground elevation adjacent to the Property also decreases, particularly in the southern portion of the Property where a retaining wall is present. The natural topography to the northwest of the Property is an undisturbed steep wooded ridge that rises to a forest which has a surface elevation of approximately 73 feet above mean sea level (AMSL) north of the Site and approximately 102 feet AMSL northwest of the Site. This wooded ridge slopes from the north to the south, dropping to the parking lot at 20-30 Garvies Point Road at an elevation of approximately 16 feet AMSL.

The Site is underlain by Pleistocene-aged upper glacial deposits consisting primarily of stratified fine to coarse sand, with gravel boulders and silty sand with lenses of clay and silt. Some discontinuous fill material is also present on the Property. The saturated thickness of the shallow deposits form the Upper Glacial Aquifer (UGA), which is under unconfined (water table) conditions. A locally continuous shallow clay layer has been observed within the upper glacial deposits and generally above the regional water table. This shallow clay layer contains perched groundwater both within the clay and perched atop of the clay. This clay unit extends from the northwest portion of the Property, along much of the northern portion of the study area and occurs primarily, but not entirely, under the adjacent Preserve to the north and west.

An extensive clay aquitard, referred to as the Lower Clay Unit, exists beneath the fill and glacial deposits across the entire Site. Beneath the southern part of the Property, the upper surface elevation of the Lower Clay Unit is at its highest (about 22 feet AMSL), and it slopes off to the south and to the north, forming an east-west trending subsurface clay mound. A natural valley in the Lower Clay Unit extends in a westerly direction from the northern portion of the Site, and its surface elevation is as deep as (-) 62 feet AMSL at the western limit of the study area.

Groundwater flows from the Property in two general directions, referred to as a groundwater divide, to the south and to the north and northwest, generally divided by the clay mound in the Lower Clay Unit that underlies the southern portion of the Property. The fluctuation in groundwater levels at the Site-wide monitoring well network over time has been observed to be on average greater than five feet, however, wells northwest of the Property had a smaller range of fluctuations under non-pumping conditions.

Conceptual Site Model

The distribution of the residual-phase LNAPL, or non-aqueous phase liquid (NAPL) that is trapped in the pore spaces between the soil particles and cannot be easily moved hydraulically, indicates LNAPL migrated to the northwest as a result of the groundwater surface gradient in the area. It is estimated that the Site contains a plume of approximately 346,500 pounds of LNAPL, which contains approximately 116,000 pounds of identified VOCs.

Subsurface hot spots that remain on the Property after the OU2 remediation have been identified during 2003 and 2006 soil investigations. Detected concentrations of VOCs exceeding 1991 ROD

soil cleanup levels were primarily limited to four soil boring locations, SSB-03, SSB-06, SSB-11, and MW-17, as shown on Figures 4-8 through 4-14 in the SRI.

The groundwater plume extends approximately 700 feet off of the former Mattiace Property in the west-northwest direction. The extent of chlorinated ethenes and benzene, toluene, ethylbenzene and total xylenes (referred to as “BTEX”) north of the groundwater divide follow the groundwater flow system, converging into the west trending valley in the upper surface of the Lower Clay Unit. Groundwater flow from the former Mattiace Property to the south is minimal. Potential impacts to the south of the former Mattiace Property are to be the subject of future investigations.

The Chemicals of Potential Concern (COPCs) for groundwater primarily include select chlorinated VOCs and BTEX. A complete list of Contaminants of Concern (COCs) is shown in the Summary of Site Risks Section.

LNAPL Delineation

Between September 2011 and May 2012, a total of 18 ultraviolet optical screening tool (UVOST) laser-induced fluorescence (LIF) points (TRC-UVOST-6 to TRC-UVOST-23) and six soil borings were advanced to define the limits of the LNAPL plume north, northwest and west of the former Mattiace Property in the Glen Cove Development Authority (GCDA) and the Nassau County Garvies Point Preserve (Preserve) parcels and at 20-30 Garvies Point Road.

During the installation of the UVOST LIF points, the presence of LNAPL was determined by the measured fluorescence response of subsurface materials. During the advancement of soil borings, soil samples were collected and screened with a photoionization detector (PID) and visually evaluated for the presence of LNAPL.

The current extent of free-phase LNAPL, measured in wells in 2011-2013, is shown on Figure 2. The free phase LNAPL detected during the 1991 RI at wells MW-07S and MW-10 has not been present since it was last detected in 2009. There were three wells with large (>1 feet) apparent LNAPL thicknesses in May 2009 (wells PW-1, PW-3, and R-02). These large LNAPL thicknesses have not been seen since and are probably the result of LNAPL accumulation in these groundwater extraction wells. LNAPL can accumulate in a groundwater extraction well because the cone of depression induces water and LNAPL movement into the well, but only water is pumped out until the LNAPL thickness reaches the pump intake. Therefore, the LNAPL floating on top of the water can accumulate. Water level and LNAPL monitoring after 2009 has shown LNAPL accumulation in well R-02 but only once in wells PW-1 or PW-3 (October 2011 – 0.41 feet).

Analyses indicate that the LNAPL consists primarily of petroleum constituents, but it also contains chlorinated VOCs. The responses of the LIF probes indicate the LNAPL saturation in the residual phase is a relatively low percentage of saturation. The extent of LNAPL free phase and residual phase is shown in Figure 2, illustrating the minimum and maximum extent of each zone. The expected mass is estimated to be approximately 346,500 pounds of LNAPL. The 2009 LNAPL analyses exhibit an average of approximately 33.4 percent of the LNAPL to be VOCs that are COCs. Therefore, the 346,500 pounds of LNAPL are estimated to contain approximately 116,000 pounds of VOCs.

Groundwater Investigation

Twenty-four soil borings were advanced at locations north, northwest and west of the former Mattiace Property, 18 soil borings were advanced at locations near MW-01, and 10 soil borings were advanced at locations near MW-45 as shown on Figure 3. Samples from fourteen soil borings were collected and submitted for laboratory analysis for VOCs included on the EPA's target compound list (TCL) of compounds for which to screen. A temporary groundwater monitoring point was placed into each borehole. Groundwater samples were collected and submitted for laboratory analysis for TCL VOCs. Additionally, a total of 28 groundwater (shallow and deep) monitoring wells were installed at locations shown on Figure 3. Shallow groundwater monitoring wells were screened approximately five feet above and ten feet below the water table. Deep monitoring wells were screened approximately five feet above the surface of the lower confining clay unit.

Three comprehensive rounds of groundwater sampling were conducted between November 2011 and February 2013, with 53 to 63 monitoring wells sampled in each round. Analytes varied but included TCL VOCs, natural attenuation parameters, phospholipid fatty acids, *dehalococcoides ethenogenes* deoxyribonucleic acid, TCL SVOCs, TCL pesticides and/or target analyte list metals.

North of the Divide

Chlorinated Ethenes

The extent of chlorinated ethenes in the groundwater north of the divide is shown on Figure 4. Individual chlorinated ethenes (PCE, TCE, cis-1,2-DCE, and vinyl chloride) maps can be seen in Figures 5 through 8. The distribution of total chlorinated ethenes shows the highest concentrations (greater than 100,000 micrograms per liter ($\mu\text{g/L}$)) centered at wells MW-11 and STMP-05, in the northeast corner of the Property. Another area of greater than 100,000 $\mu\text{g/L}$ total chlorinated ethene concentrations is centered on well MW-07S, to the west and downgradient of MW-11. Downgradient of well MW-07S, the chlorinated ethenes continue to follow the groundwater flow path, converging with the groundwater flow into the lower portions of the valley in the Lower Clay Unit. There is no density-dependent downward migration occurring, as evidenced by the elevated total chlorinated ethene concentration detected in shallow well MW-07S compared to the less than 1 $\mu\text{g/L}$ total chlorinated ethene concentration detected in adjacent deep well MW-07D. The extent of chlorinated VOCs drops off rapidly west of well MW-RD-01S, which is near the downgradient edge of the residual phase LNAPL. This indicates that once groundwater migrates beyond the LNAPL area, which acts as a continuing source of groundwater contamination, concentrations decline quickly. Analysis of the SRI sampling results indicate cis-1,2-DCE is the predominant chlorinated ethene present in the plume throughout the length of the plume, with vinyl chloride being the secondary constituent detected throughout the eastern portion of the plume.

Two other elevated total chlorinated ethene concentration contours are south of the former northeast USTs, one centered on well MW-12, and one at location STMP-12. MW-12 is located adjacent to the former stormwater drain line and USTs, while STMP-12 is located in the vicinity of the former stormwater separator. Groundwater flow from both of these locations is to the west or northwest and follows the general westerly groundwater flow that converges into the valley in

the Lower Clay Unit. These source areas contribute to the extent of chlorinated VOCs to the west of the Site, broadening the plume out to the north and south the further west it goes.

The chlorinated ethenes at well MW-12 are predominantly TCE and cis-1,2-DCE, with no detectable PCE or vinyl chloride. The total chlorinated ethenes at location STMP-12 are shown to consist entirely of cis-1,2-DCE and vinyl chloride. Inspection of the PCE isoconcentration map shows that there is very little detectable PCE in groundwater throughout the rest of the Property. The only PCE detected on the southern portion of the Property (closest to the groundwater divide) is low concentrations detected at wells NVE-09 (94 µg/L), NVE-05 (1.3 µg/L), and a couple of wells south of the clay mound with concentrations estimated at less than 1 µg/L (PZ-01 and PZ-04). The PCE isoconcentration map also shows a small area of PCE contamination in the back parking lot of 20-30 Garvies Point Road, near well TRC-TMP-4A, migrating downgradient, to the northwest, to well TRC-MW-21. This isolated plume also appears on the TCE isoconcentration map, the cis-1,2-DCE map, and on the vinyl chloride map. The TCE isoconcentration map shows no other sources than those described above. The cis-1,2-DCE and vinyl chloride maps show these constituents following the groundwater flow path to the northwest and west, moving into the valley in the Lower Clay Unit.

BTEX

The extent of total BTEX in groundwater north of the divide is shown on Figure 9, which is based on the maximum concentrations detected at each well nest. The extent of the BTEX plume is very similar to the chlorinated ethenes plume, with the highest concentration (greater than 100,000 µg/L) in the vicinity of the former northeast USTs. Lower concentration peaks are also present to the south of the northeast UST area, again in the vicinity of wells MW-12 and STMP-12. Like the total chlorinated ethenes plume, the BTEX plume converges into the valley in the Lower Clay Unit west of the Site.

A BTEX concentration profile from well MW-11 to the west presented in the SRI report shows a longer distance of relatively flat concentration, showing little decline in each constituent until somewhere between MW-RS-015 (about 400 feet downgradient of the source area) and TRC-MW-34 (about 660 feet downgradient of the source area).

1,1,1-Trichloroethane (TCA)

The 1,1,1-TCA concentration distribution is very similar to the distribution of total chlorinated ethenes in the northeast portion of the Site and in the western migration route, downgradient of the former USTs (See Figure 10). 1,1,1-TCA concentrations decline along the western flow path, with the highest downgradient concentration detected at well TRC-TMP-12 (470 µg/L). Downgradient of this well, the 1,1,1-TCA concentrations decline rapidly, like the chlorinated ethenes and BTEX, to levels less than the NYSDEC Class GA Groundwater Quality Standard (5 µg/L).

Dichloromethane

The distribution of dichloromethane is similar to the total chlorinated ethenes, although at lower concentrations (See Figure 11). There are two apparent sources on Site, in the vicinity of well MW-11 and well MW-12. Concentrations decline from these maximums to non-detect levels in relatively shorter distances than for the chlorinated ethenes. Some random hits of dichloromethane occur at downgradient locations (e.g., MW-RD-01S, TRC-TMP-12). However, these are within

the footprint of the other chlorinated VOCs. The dichloromethane concentrations in some of the samples may be related to atypical lab contamination of samples (from a lab solvent) and the impact of sample dilution during analysis on the reported results.

1,2-Dichlorobenzene

The source of 1,2-dichlorobenzene is likely the former northeast UST area, with a maximum concentration detected at well MW-11. See Figure 12 for concentration contours. Unlike the chlorinated ethenes and BTEX, there do not appear to be substantial sources at other locations (i.e., near well MW-12 and STMP-12). However, because of required sample dilutions, the detection limits are 1,000 µg/L at these locations. Concentrations are shown to decline west of the Property, but they stay relatively flat between 120 µg/L and 150 µg/L. However, no 1,2-dichlorobenzene is present at the further downgradient wells.

1,2-Dichloroethane

1,2-Dichloroethane is detected within the source areas north of the divide at relatively low concentrations compared to the chlorinated ethenes (e.g., MW-11 at 360 µg/L versus total chlorinated ethenes of 161,500 µg/L and MW-12 at 370 µg/L versus 185,650 µg/L). Concentrations drop off dramatically downgradient, although there were elevated detection limits at some wells. Near the downgradient edge of the chlorinated ethenes plume, 1,2-dichloroethane is present at 2.6 µg/L at TRC-MW-32D, and concentrations decline further to non-detectable levels (<1 µg/L) at downgradient wells TRC-MW-41 through TRC-MW-43.

2-Butanone

Inspection of data show that the highest concentrations are present in the vicinity of the former USTs (e.g., wells MW-11 at 5,200 ug/L, and MW-08D at 7,700 ug/L) and STMP-12 (5,300 ug/L) near the southern USTs. Limited areas reflect concentrations in excess of the NYSDEC Class GA Value (50 µg/L) in a few monitoring wells downgradient of these former source areas, within the chlorinated ethenes and BTEX plume footprint. On August 15, 2012, 2-butanone was detected at well TRC-MW-21 at 380 µg/L, but it was not detected (<5 µg/L) on November 28, 2012.

Naphthalene

Naphthalene data show that the highest concentrations are present in the vicinity of the former USTs including wells MW-10 (920 µg/L) and MW-08D (640 µg/L). However, well MW-12, south of this area, was non-detect (<9.4 µg/L). The furthest monitoring downgradient of the Site in which naphthalene was detected was well TRC-MW-26D (150 µg/L). At downgradient well TRC-MW-32D, naphthalene was not detected (<10 µg/L).

Iron and Manganese

Iron and manganese concentrations show that the majority of samples contain iron and manganese in excess of their combined NYSDEC Class GA Value (500 µg/L). The source of both iron and manganese is most probably naturally occurring, as a consequence of dissolution of iron hydroxides and manganese dioxide from the soils because of the strongly anaerobic conditions associated with the groundwater.

Clay Mound and South of the Divide

For the purposes of this investigation, the scope of addressing groundwater in the vicinity of the clay mound and area south of the divide is limited to within the former Mattiace Property boundary and the retaining wall to the west of the Property boundary. The groundwater flow on the southern portion of the Property is influenced by the shallow topography of the Lower Clay Unit, the overlying interbedded silts, clays, and sands, and the structures that extend into the shallow clay. Structures that extend into the shallow clay include the retaining walls along the entrance road and several buildings south of the Property.

Total chlorinated ethenes (comprised almost entirely of cis-1,2-DCE and vinyl chloride) were detected at highest concentrations (greater than 10,000 ug/L) in groundwater samples collected from monitoring wells located in the southwest corner of the former Mattiace Property. Total chlorinated ethenes were detected at concentrations ranging from below detection limits to 440 µg/L in groundwater based on samples collected from other monitoring wells south of the divide.

BTEX was detected at the greatest concentrations in the groundwater samples collected from monitoring wells located in the southeast corner of the former Mattiace Property. BTEX was detected at concentrations ranging from non-detection to 276 µg/L in groundwater based on samples collected from other monitoring wells south of the divide.

Further investigation and evaluation of groundwater contamination and its potential sources south of the former Mattiace Property will be required in the future.

Assessment of Natural Attenuation: Geochemical Parameters

Natural attenuation processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. If testing indicates that conditions are favorable for natural attenuation at a site, the Agency can consider relying on natural attenuation as a remedy, or as a component to a remedy. Several water quality parameters have been analyzed as general indicators of the reducing-oxidizing (redox) conditions and other geochemical conditions in the groundwater. The constituents discussed here include nitrate-nitrogen, sulfate, sulfide, methane, dissolved oxygen (DO), redox potential (ORP), and pH. Based on the data, the groundwater throughout the chlorinated ethenes and BTEX plume is strongly reducing, in the sulfate reducing to methanogenic range.

Groundwater geochemical data provide a good indication of the redox conditions present at a location within an aquifer. The geochemical parameters that indicate the redox conditions in groundwater are as follows (in order of weaker to stronger reducing conditions): oxygen depletion; nitrate reducing conditions indicated by low nitrate-nitrogen concentration; iron reducing conditions indicated by high dissolved divalent iron; sulfate reducing conditions indicated by low sulfate concentrations or the presence of sulfide; and methanogenic conditions indicated by the presence of dissolved methane.

The strength of the reducing conditions in groundwater is of significance for the chlorinated ethenes because the higher chlorinated parent compounds (PCE and TCE) can biodegrade in groundwater under weakly anaerobic conditions (e.g., nitrate to iron reducing), whereas the daughter breakdown products require stronger reducing conditions (i.e., sulfate reducing conditions or methanogenic conditions).

An analysis of the data of the redox sensitive parameters reveals that the presence of nitrate-nitrogen, divalent iron, sulfate, sulfide, and methane indicate that there are methanogenic conditions present throughout the extent of the chlorinated ethene and BTEX plumes, which represents a strongly reducing environment.

The pH of the groundwater ranged from 3.95 to 10.94 for the 2011 sampling data, with an average of about 7.0. The majority of the pH values are within the range conducive to biodegradation (between pHs of 5 to 9).

The preliminary screening approach for assessing reductive dechlorination is presented in Appendix N of the SRI Report for each well. The screening approach assigns a monitored natural attenuation (MNA) score. The interpretation of this MNA score in the 2009 EPA guidance is as follows: 0 to 5 inadequate evidence for anaerobic biodegradation of chlorinated organics, 6 to 14 limited evidence for anaerobic biodegradation of chlorinated organics, 15 to 20 adequate evidence for anaerobic biodegradation of chlorinated organics, and >20 strong evidence for anaerobic biodegradation of chlorinated organics. Most of the wells within the core of the chlorinated VOC plume score greater than 20, indicating strong evidence for anaerobic degradation of chlorinated organics.

Based on multiple lines of evidence, the chlorinated ethenes and BTEX are being degraded in the groundwater on and downgradient of the former Mattiace Property. These lines of evidence include the following: the decline in the parent compound concentrations (both the chlorinated ethenes and BTEX are declining), the presence of daughter (or breakdown) products, the decline in those daughter products, and the presence of appropriate biogeochemical conditions (the strongly reducing conditions (methanogenic conditions) appropriate for degradation of the chlorinated ethenes. In addition, microbial populations of *dehalococcoides ethenogenes* are present in significant concentrations. BTEX are also degraded in these anaerobic conditions. Other COCs in this area, 1,1,1-TCA, dichloromethane, 1,2-dichlorobenzene, and chloroform, are present at much lower concentrations and decline in concentration downgradient of the former Mattiace Property.

Soil Vapor

Total chlorinated ethene and BTEX concentrations in soil vapor monitored on the former Mattiace Property relative to remedial system performance show that soil vapor concentrations have declined dramatically, but with significant variability, part of which could be attributed to differences in the status of the extraction systems during sampling periods. Despite a dramatic decline in soil vapor concentrations, the levels still pose a potential future risk to receptors.

LAND AND RESOURCE USE

The Site includes the former Mattiace Property, a portion of the Preserve, bordering the former Mattiace Property to the north that has been impacted by the migration of contaminated groundwater from the Mattiace Property, and contaminated groundwater beneath the properties. Land use designations for these properties are:

- **Former Mattiace Property.** Zoned Marine Waterfront District – 3: this designation applies to the waterfront and adjacent areas on the north side of Glen Cove Creek. This zoning framework supports the creation of an attractive mixed-use community that includes residential/retail/commercial/business/recreation/tourism, entertainment and cultural components. The HHRA evaluated current and future residential and industrial land uses.
- **Preserve.** While the Preserve is designated a residential area on current Glen Cove zoning maps, the Preserve is owned by Nassau County and is protected by the Parks Act, which prohibits development of the Preserve in perpetuity.

No industrial/commercial activities have occurred on the Preserve. In addition, since the Mattiace Property activities did not impact the soils on the Preserve, neither surface soil nor subsurface soils are considered an exposure point in the Preserve. Exposures to soils on the Preserve property were not quantitatively evaluated in the HHRA.

- **Groundwater.** Under the New York regulations, the aquifer is classified as Class GA (6 NYCRR 701.18), meaning that it is designated as a potable water supply. Therefore, future use of the aquifer as a drinking water supply was evaluated.

SUMMARY OF SITE RISKS

In the human health risk assessment (HHRA) cancer risks and noncancer health hazards associated with current and future Site conditions are estimated. A HHRA is an analysis of the potential adverse human health effects caused by hazardous substance releases from the Site. In preparing the HHRA, it is assumed no further remedial actions to control or mitigate exposure to Site hazardous substances would be taken and that Institutional Controls (ICs) are not in place.

Baseline Human Health Risk Assessment

The development of the HHRA followed appropriate EPA risk assessment guidelines, guidance, and policies. A Superfund HHRA is an analysis of the potential adverse human health effects caused by hazardous substances exposure from a site in the absence of any actions to control or mitigate exposure under current and future land use assumptions. The HHRA also assumes no ICs or actions (such as fencing) to prevent exposure to the contaminated groundwater, subsurface soils, and soil gas at the Site, including the former Mattiace Property and the Preserve, except as noted below. The HHRA is available in Appendix O of the Supplemental Remedial Investigation report and was prepared by TRC. The risk assessment entitled “Baseline Human Health Risk

Assessment” includes the detailed analysis of cancer risks and noncancer health hazards for various receptors at the Former Mattiace Property (referred to as on-Site throughout the HHRA, “Summary of Site Risks” Section of the ROD Amendment, and Table 2), adjacent off-Property areas (referred to as off-Site throughout the HHRA, “Summary of Site Risks” Section of the ROD Amendment and Table 2), and, where appropriate, the Garvies Point Preserve.

Land Use

In the HHRA, exposure to COPCs was evaluated on the 1.9-acre former Mattiace Property. The HHRA evaluated the impacted soil on-Site and groundwater areas on adjacent properties. Land use designations for these properties are described above in the “Land and Resource Use” section.

Risk Assessment Process

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step risk assessment process includes:

- *Hazard Identification* – uses the analytical data collected to identify the contaminants of potential concern (COPCs) at the Site for each medium, with consideration of a number of factors explained below;
- *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed;
- *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
- *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks. The risk characterization also identifies contamination with concentrations that exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1×10^{-6} to 1×10^{-4} or a hazard index greater than 1. Contaminants at these concentrations are considered COPCs and are typically those that will require remediation at the Site. Also included in this section is a discussion of the uncertainties associated with these risks.

Data Collection and Evaluation (Hazard Identification)

Validated subsurface soil and groundwater data collected at the Site were evaluated in the HHRA. The soil data included historical data collected from 2000 to 2006 and additional data collected in 2012 to evaluate data gaps. Validated groundwater data included historical data collected from 2003 to 2006 and additional sampling data collected from 2012 to 2013. Soil gas samples, collected at 25 locations in 2011 and 2012 were analyzed for VOCs.

COPC concentrations in groundwater and soil were screened against residential soil and tapwater concentrations associated with a cancer risk of 1×10^{-6} or a chemical-specific Hazard Quotient (HQ) = 0.1 (HQ = 0.1). All known human carcinogens were selected as COPCs regardless of risk

level. COPCs included a wide range of VOCs, SVOCs, pesticides, and metals.

The maximum VOC soil gas sample location concentrations were evaluated using the EPA's "Vapor Intrusion Screening Level Calculator, Subslab or Exterior Soil Gas Concentration to Indoor Air Concentration Calculator Version 3.1." Using this tool, the risk evaluation of vapor intrusion from groundwater at adjacent commercial property (south and west of the former Mattiace Property) was conducted using groundwater data to predict indoor air concentrations.

Chemicals of Concern

COCs in groundwater, subsurface soil, and soil gas modeled to indoor air concentrations were identified in the baseline human health risk assessment (HHRA). The baseline HHRA is Appendix O of the Supplemental Remedial Investigation report. A list of chemicals that exceed the goal of protection of a risk of one in a million (1×10^{-6}) and/or a noncancer HI = 1 for groundwater, subsurface soil, and soil gas organized by media are provided below.

Groundwater:

Volatile Organic Compounds (VOCs). TCE, cis-1,2-dichloroethylene (cis-1,2-DCE), PCE, toluene, 1,1-dichloroethane, 1,2-dichlorobenzene, 1,2-dichloroethane, 1,4-dichlorobenzene, 2-butanone, benzene, chloroform, dichloromethane, ethylbenzene, toluene, vinyl chloride, and total xylene.

Semi-volatile organic compounds (SVOCs): bis(2-ethylhexyl)phthalate and naphthalene.

Pesticides: 4,4'-dichlorodiphenyl dichloroethane (4,4'-DDD).

Metals: arsenic (inorganic), cadmium, cobalt, iron, manganese, and nickel.

Subsurface Soil:

VOCs: TCE, PCE and total xylenes.

Soil Gas:

VOCs found in soil gas were evaluated using USEPA's Vapor Intrusion Screening Level Calculator, Subslab or Exterior Soil Gas Concentration to Indoor Air Concentration Calculator Version 3.1. The risk evaluation from vapor intrusion from off-Site commercial property groundwater (South and West of the former Mattiace Property) was conducted using EPA's Vapor Intrusion Screening Level Calculator, Groundwater Concentration to Indoor Air Concentration Calculator Version 3.1. Soil gas COCs identified based on these models include: 1,2-dichloroethane, benzene, carbon tetrachloride, chloroform, ethylbenzene, *p*-dichlorobenzene, PCE, TCE, and vinyl chloride.

Health effects from exposure to the COCs include:

- **Carcinogenic Effects.** COCs organized by Weight of Evidence Classifications include:
 - *Known Human Carcinogens* – TCE, vinyl chloride and arsenic.
 - *Probable Human Carcinogens* - 1,2-dichloroethane, 1,4-dichlorobenzene, chloroform, and bis(2-ethylhexyl)phthalates.

- *Likely to be carcinogenic to humans* – dichloromethane, PCE, and 4,4'-DDD.
- *Possible human carcinogens* – 1,1-dichloroethane.
- *Not classifiable or inadequate information to classify chemical carcinogenicity* – 1,2-dichlorobenzene, cis-1,2-DCE, 2-butanone, toluene, total xylenes, naphthalene, manganese, and cadmium.
- *Not classified as to carcinogenicity* – cobalt, iron, and nickel (not classifiable based on oral exposure).

Further information regarding classifications are provided in ROD Tables 2.4a and b.

- **Non-cancer health effects.** The range of health effects associated with the COCs include: impacts on major organ systems (i.e., liver, kidney, blood, thymus, neurotoxicity, vascular system, and skin). Other health impacts include: developmental effects, toxicity to the thymus, and decreased bodyweight. The chemical specific health effects for each COC are provided in Tables 2.3a and b.

Exposure Assessment

In Table 2.1, Conceptual Site Model, exposures to subsurface soils, groundwater, soil gas through vapor intrusion, and surface water are evaluated. Based on anticipated future land use, a calculation of the current and future cancer risks and noncancer hazards was performed in the HHRA under residential and industrial scenarios. Potential exposures to surface soils which have been remediated under the June 1991 ROD for soil were excluded.

The Preserve surface soils were also excluded. Future development of the Preserve is not anticipated since it is owned by Nassau County and protected by the Parks Act that prevents development of the property in perpetuity, however, the zoning of this property on County maps is residential.

Receptors.

The following potential exposure scenarios and pathways that are described in Table 2.1 were evaluated in the HHRA:

- *Current/Future On-Site Utility Workers* – may potentially be exposed to Site chemicals in the subsurface soil and in shallow groundwater (less than 15 feet below ground surface (bgs)) while maintaining on-Site utilities. Routes of exposure include incidental ingestion and dermal contact with subsurface soils, inhalation of fugitive dusts and volatiles from subsurface soils, dermal contact with shallow groundwater, and inhalation of volatiles from groundwater.
- *Future On-Site Construction Workers* – may potentially be exposed during construction of future buildings. Exposures may occur to subsurface soil and shallow groundwater. Routes of exposure include incidental ingestion and dermal contact with subsurface soils, and inhalation of fugitive dusts and volatiles from subsurface soils and shallow groundwater.
- *Future On-Site Residents (children and adults)* – may be exposed to the following: subsurface soils brought to the surface during development without appropriate management; groundwater as a source of domestic drinking water; and soil gas via vapor intrusion. Potential

exposure routes include ingestion and dermal contact with subsurface soils, ingestion and dermal contact with groundwater, inhalation of VOCs in indoor air while showering, and vapor intrusion of volatiles from soil gas.

- *Future On-Site Industrial/Commercial Workers* – may be exposed to the following: subsurface soil brought to the surface during future development without appropriate soil management, groundwater as a source of domestic drinking water, and soil gas through vapor intrusion. Potential exposure routes include dermal contact with soils, ingestion of groundwater, and inhalation of soil gas vapors.
- *Current/Future Off-Site Industrial/Commercial Workers* – may be exposed to contaminants in groundwater via inhalation of volatiles through vapor intrusion. The exposure routes include inhalation of VOCs in indoor air as a result of vapor intrusion from groundwater.

Table 2.1 describes the rationale for not evaluating current trespassers, current/future residential hikers, and future off-Site residents at Garvies Point Museum and Preserve property.

Exposure Point Concentrations.

Table 2.2 provides chemical-specific Exposure Point Concentrations (EPCs) used to calculate cancer risks and noncancer health hazards. Table 2.2 includes the range of chemical specific detected concentrations, the frequency of detection, and the statistical method used to develop the soil and groundwater EPCs. The EPCs include a chemical's maximum-detected concentration where less than four distinct values are available. Where adequate data was available, EPA's ProUCL software was used to calculate a statistical concentration that represents the upper confidence limit (UCL) of the average concentration.

Exposure Assumptions for Various Receptors.

Chronic daily intakes were calculated for an individual based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to represent a conservative exposure scenario that is still within the range of possible exposures. Central tendency exposure (CTE) assumptions, which represent typical, average exposures, were also developed, although the RME calculated cancer risks and noncancer health hazards serve as the basis for decisions. A complete summary of all exposure scenarios can be found in the HHRA.

Consistent with the Site future land use assumptions, cancer risks and noncancer health hazards from exposure to subsurface soils, groundwater and indoor air based on soil gas were evaluated. The residential exposures were assumed to occur over a period of 30 years (i.e., six years for a young child and 24 years for an adult). Residents were assumed to be exposed to soils and groundwater for 350 days/year. Chemicals with a mutagenic mode of action were evaluated considering exposures to children less than 16 years of age.

Exposures to current/future on-Site utility workers assumed exposures of 28 days/year for a period of 25 years. Exposure to current/future construction workers included exposures for 250 days/year

for a period of one year. Exposure to future on- and off-Site industrial/commercial workers assumed exposures of 250 days/year for 25 years.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to Site-related chemicals are considered separately. Consistent with current EPA policy, it is assumed that the toxic effects of the Site-related chemicals are additive. Thus, cancer risks and noncancer health hazards associated with exposures to individual COCs were summed to indicate the potential cancer risks and noncancer hazards associated with mixtures, respectively.

Toxicity data for the human health risk assessment were selected based on procedures identified in OSWER Directive 9285.7-53. The toxicity information and source of this data is presented in Tables 2-3a and 2-3b (noncancer toxicity data summary) and Tables 2.4a and b (cancer toxicity data summary). Additional toxicity information for all COCs is presented in the HHRA.

Chemicals identified with a mutagenic mode of action (MMA), including TCE and vinyl chloride, were evaluated consistent with EPA guidance entitled “Supplemental Guidance for Assessing Susceptibility for Early-Life Exposure to Carcinogens” (EPA/540/R/99/005, July).

Risk Characterization

Quantitative estimates of cancer risks and noncancer health hazards are a component of the risk characterization. The risk characterization evaluates potential health risks based on estimated exposure intakes and toxicity values. For carcinogens, cancer risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen.

Noncancer health hazards are calculated using a HQ for each chemical where an exposure level for a specified time period (e.g., 30 years for residential exposures) are compared with an oral Reference Dose (RfD) derived for a similar exposure period. The RfD, as defined by EPA’s Integrated Risk Information System (IRIS – www.epa.gov/iris), “is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is thought to be without an appreciable risk of deleterious effects during a lifetime.” To assess the overall noncancer health effects posed by more than one contaminant, an HI is developed by adding together chemical specific HQs. The HQs are summed for all COCs within an exposure pathway (e.g., ingestion of soil) and across pathways to determine the HI. When the HI is greater than 1, there may be a concern for potential noncancer health effects if the COC in question is believed to cause similar toxic effects.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. The excess lifetime cancer risk was determined for each COC by multiplying the COC-specific exposure dose by the cancer slope factor for oral or dermal exposures. The resulting cancer risk estimates are expressed in scientific notation as a probability (e.g., 1×10^{-6} or one in a million). The risks of individual COCs are summed for each pathway and each chemical to develop a total risk estimate. An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may

occur in a population of 10,000 people who are exposed under the conditions identified in the exposure assessment. The range of acceptable risk is 1×10^{-4} to 1×10^{-6} of an individual developing cancer over a 70-year lifetime from exposure to the COC(s) under specific exposure assumptions. Therefore, sites with carcinogenic risk below the risk range for a RME exposure do not generally require cleanup based upon a carcinogenic risk range established under the NCP.

Summary of Cancer Risks and Noncancer Health Hazards to Various Receptors

The following sections highlight the cancer risks and noncancer hazards associated with each receptor. The cancer risks and noncancer hazards provided below are consistent with the information presented in the HHRA. In many cases, the values presented in the HHRA are rounded to one significant figure. The tables identified below for each receptor provide the cancer risk calculations and noncancer HQ for individual chemicals that exceed the goal of protection and a HQ = 1. The sums presented are not rounded to one significant figure and do not include those chemicals that are below the risk range or an HQ = 1, and they, therefore, may differ slightly from those presented in the Tables.

Current/Future Utility Workers

In Table 2.5a, the total RME cancer risk and noncancer HI for the current/future adult utility worker exposed to on-Site subsurface soils and shallow groundwater are presented. The total cancer risks are 2×10^{-4} and the HI = 6.1. The cancer risks exceed the risk range and the noncancer health hazard exceeds the goal of protection of an HI = 1. Primary COCs in groundwater were vinyl chloride, bis-2(ethylhexyl)phthalate, PCE, TCE, cis-1,2-DCE and ethylbenzene. Cancer risks from ingestion of on-Site subsurface soil were below the risk range and the noncancer HI = 1.

In Table 2.5b, the total CTE cancer risk and noncancer health hazards for the current/future utility worker are presented. The cancer risk is 6×10^{-5} which is within the acceptable risk range and the noncancer HI = 6.1 exceeds the goal of protection of an HI = 1. The main contributors to the noncancer HI is TCE, bis-2(ethylhexyl)phthalate, vinyl chloride and cis-1,2-DCE.

Current/Future Construction Worker

In Table 2.6a, the total RME cancer risks and the noncancer HI for the construction worker are presented. The cancer risks are 6×10^{-5} and the HI = 55. The cancer risks are within the acceptable risk range. The noncancer HI exceeds the goal of protection of an HI = 1, and the main chemicals contributing to the HI are cis-1,2-DCE, toluene, TCE, PCE, and bis(2-ethylhexyl)phthalate.

Exposures to on-Site subsurface soils were below the risk range, and the noncancer goal of protection of an HI = 1. Construction worker exposure to fugitive dust and inhalation of volatiles are below both the risk range and the noncancer goal of protection of a noncancer HI = 1.

In Table 2.6b, the CTE total cancer risks and total HI for the construction worker are presented. The cancer risks were 5×10^{-5} and the HI = 48. The cancer risks are within the acceptable risk range, but the noncancer HI is greater than the goal of protection of an HI = 1. The main contributors to the noncancer HI are cis-1,2-DCE, vinyl chloride, TCE, PCE and bis(2-

ethylhexyl)phthalate.

Future On-Site Resident

Adult RME. Exposure to subsurface soil were below the risk range and a noncancer HI = 1.

In Table 2.7a, the total RME cancer risks and total HI for the future adult on-Site resident exposed to tap water are presented. The cancer risks and noncancer health hazards associated with exposure to groundwater are 4×10^{-2} and an HI = 4,000, respectively. The cancer risk exceeds the risk range and is primarily the result of exposures to TCE, vinyl chloride, benzene, chloroform, and ethylbenzene. The noncancer HI exceeds the goal of protection of an HI = 1 and the main COC contributing to the HI are TCE, cis-1,2-DCE, total xylene, dichloromethane, and PCE.

In Table 2.7b, the total RME cancer risks and HI for the future adult on-Site resident exposed to soil gas in indoor air through vapor intrusion are presented. The cancer risks are 4×10^{-3} and the HI = 630. The cancer risks exceed the risk range and the primary contributors are TCE and vinyl chloride. The noncancer HI exceeds the goal of protection of an HI = 1 and the primary contributor is TCE, PCE and total xylene.

In Table 2.7c, the adult CTE cancer risks of 5×10^{-3} and the noncancer HI = 2,300 from exposure to tapwater are presented. The cancer risks exceed the risk range and the noncancer HI exceeds the goal of protection of an HI = 1. The CTE cancer risk is primarily driven by vinyl chloride and TCE. The main contributors to the noncancer HI are TCE, cis-1,2-DCE, total xylene, dichloromethane, benzene, and PCE.

The total CTE cancer risks and total HI for the future, adult, on-Site residents exposed to soil gas in indoor air through vapor intrusion are 2×10^{-3} and the noncancer HI = 420. The cancer risks exceed the risk range and the noncancer HI exceeds the goal of protection of an HI = 1. The main contributors to the CTE cancer risks are TCE and vinyl chloride. The main contributor to the CTE noncancer HI is TCE.

Child RME. The total RME cancer risks and total HI for the future on-Site child resident exposed to on-Site subsurface soil was below the risk range and goal of protection of an HI = 1.

In Table 2.8a, the total RME cancer risks and total HI for the future child on-Site resident from exposure to groundwater are 4×10^{-2} and the HI = 6,400, respectively, are presented. The cancer risks exceed the risk range and the noncancer HI is greater than the goal of protection of an HI = 1. The cancer risk is primarily driven by TCE and vinyl chloride. The main contributors to the noncancer HI are cis-1,2-DCE, dichloromethane, PCE, TCE, vinyl chloride, and total xylene.

In Table 2.8b, cancer risks and noncancer health hazards to a child exposed to volatiles in indoor air as a result of vapor intrusion of soil gas are presented. The cancer risk is 4×10^{-3} and a noncancer HI = 630 that exceed the risk range and the goal of protection of an HI = 1. The main contributors to the cancer risk are TCE, PCE, and vinyl chloride. The main contributors to the noncancer HI are TCE, PCE, and total xylene.

In Table 2.8c, the child CTE cancer risks of 1×10^{-2} and the noncancer HI = 3,500 from exposure to tap water are presented. The cancer risk exceeds the risk range and the noncancer HI exceeds the goal of protection of an HI = 1. The total CTE cancer risks and total HI for the future child on-Site resident that contribute to the total risk are cancer risks of 8×10^{-3} and an HI = 3,100 based on exposure to groundwater. The main contributors to the cancer risk are TCE and vinyl chloride. The main contributors to the noncancer HI are TCE, cis-1,2-DCE, dichloromethane, PCE and total xylene.

In Table 2.8d, the total CTE cancer risks and total HI for the future child on-Site residents exposed to soil gas in indoor air are 2×10^{-3} and the noncancer HI = 420 are presented. The cancer risks exceed the risk range and the noncancer HI = 1. The main contributors to the CTE cancer risks are TCE and vinyl chloride. The main CTE noncancer HI is TCE.

Future On-Site Industrial/Commercial Worker.

The total RME cancer risks and HI for the future on-Site industrial/commercial worker exposed to on-Site subsurface soil was 1×10^{-7} which is below the risk range. The noncancer HI = 0.02 is below the goal of protection of an HI = 1.

In Table 2.9a, the total RME cancer risk and HI for the future on-Site industrial/ commercial worker exposed to groundwater are 1×10^{-2} and the noncancer HI = 1,100 and exceed the cancer risk range and the noncancer goal of protection of an HI = 1 are presented. The main contributors to the cancer risks are TCE and vinyl chloride. The main chemicals contributing to the noncancer HI greater than 1 are: TCE, PCE, cis-1,2-DCE, dichloromethane, and total xylene.

In Table 2.9b, the cancer risks and noncancer HI from exposure to volatiles in indoor air as a result of soil gas vapor intrusion are presented. The cancer risk of 6×10^{-4} and a non-cancer HI = 150 exceed the risk range and the goal of protection of a noncancer HI = 1. Main contributors to the cancer risk and noncancer HI is TCE.

In Table 2.9c, the CTE cancer risks and noncancer HI for the future on-Site industrial/commercial worker are presented. The cancer risk is 4×10^{-3} , and the noncancer HI = 1,100. The main chemicals contributing to the cancer risk are TCE, ethylbenzene, and vinyl chloride. The main contributors to the CTE noncancer HI are TCE, cis-1,2-DCE, PCE, vinyl chloride, dichloromethane, toluene, bis(2-ethylhexyl)phthalate, and cobalt.

In Table 2.9d, the CTE cancer risks for exposure to soil gas in indoor air are presented. The cancer risks are 2×10^{-4} and a noncancer HI = 130. The cancer risks exceed the risk range and the goal of protection of an HI = 1. The main chemical contributing to the cancer risk is TCE. The main contributor to the CTE noncancer HI through vapor intrusion is TCE.

Current Off-Site Industrial/Commercial Worker.

In Table 2.10a, the RME cancer risks and noncancer hazards for the current off-Site industrial/commercial worker potentially exposed to Site contaminants via the inhalation of volatiles in indoor air as a result of vapor intrusion from off-Site groundwater are presented. The cancer risks for the Southern Property were 1×10^{-4} and the noncancer HI = 1. The cancer risks are within the acceptable risk range and the noncancer HI is equivalent to the goal of protection of an HI = 1.

In Table 2.10b, the CTE cancer risks and noncancer HI for the industrial/commercial worker exposed to groundwater in the Southern Property are presented. The cancer risk is 4×10^{-5} and the noncancer HI = 0.95. The cancer risk is within the acceptable risk range and the noncancer HI is less than goal of protection of an HI = 1

In Table 2.11a, the RME cancer risks and noncancer hazards for the current off-Site industrial/commercial worker potentially exposed to Site contaminants via the inhalation of volatiles in indoor air as a result of vapor intrusion from off-Site groundwater are presented. The results for the Western Property were 2×10^{-6} and the noncancer HI = 0.1. The cancer risks are within the acceptable risk range and the noncancer HI is below the goal of protection of an HI = 1.

In Table 2.11b, the CTE cancer risks and noncancer HI for the current off-Site industrial/commercial worker exposed to groundwater on the Western Property are presented. The cancer risk was 7×10^{-7} and the noncancer HI = 0.09. The cancer risk is below the risk range and the noncancer HI is less than goal of protection of an HI = 1.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a variety of uncertainties. The main sources of uncertainty in the HHRA are described below.

Sampling. Uncertainty in environmental sampling and analysis can arise in part from the potentially uneven distribution of contaminants in the media sampled. The sampling locations may not accurately reflect the range, frequency, and distribution of contaminants at a site. There are also uncertainties associated with the analytical methods and instruments used in the analysis of the samples. These uncertainties are generally likely to have a low impact on the risk assessment based on procedures to assure the quality assurance of data. The selection of COCs can also lend uncertainty to the risk assessment, but the selection process is generally conservative, so it is unlikely that chemicals that should be COCs are overlooked.

The environmental sampling is based on historical data and additional data collected during the SRI. The SRI was conducted to fill in data gaps in the nature and extent of contamination at the Site. The additional SRI data was designed to fill identified data gaps and thus reduces the uncertainty associated with unidentified contamination and incomplete characterization of the Site.

Toxicity. The lack of quantification of cancer risks and noncancer health hazards may result in potential underestimates of cancer risks and noncancer health hazards. The availability and quality of toxicity data affect the ability to derive toxicity criteria and the quality/quantity of the toxicity

criteria that are derived. Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals.

At this Site, several chemicals were not evaluated in the HHRA based on a lack of toxicity values. This may underestimate cancer risks and non-cancer health hazards.

Exposure Routes. Uncertainties can also be associated with the selection of exposure pathways and the estimation of EPCs. At this Site, the calculation of EPCs is based on the calculation of UCLs. The RME assumptions incorporated in the HHRA are intended to be conservative and may overestimate risk.

These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the HHRA provides upper bound estimates of the risks to populations near or at the Site and is not likely to underestimate actual risks related to the Site.

More specific information concerning health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the HHRA report (Appendix O of the SRI).

These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near or at the Site and is not likely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the HHRA report.

Exposure Point Concentrations. The EPCs were calculated using EPA's ProUCL software. The use of the 95 percent UCL of the mean provides reasonable confidence that the true Site average will not be underestimated. The uncertainty associated with the calculation of the EPCs will likely overestimate exposure.

In those cases where there are either an insufficient number of samples or an insufficient number of detected samples within a dataset to calculate a UCL using ProUCL, the maximum detected concentration was used in characterizing risks. For on-Site groundwater exposures, 4,4'-DDD, arsenic, cadmium, and nickel risk estimates were all based upon maximum detected concentrations. These chemicals showed elevated risk estimates in the future on-Site resident (adult and child) and the future on-Site industrial/commercial worker. For on-Site shallow groundwater exposures, bis(2-ethylhexyl)phthalate (BEHP) risk estimates were based upon maximum detected concentrations. BEHP showed elevated risk estimates in the on-Site utility and construction worker scenarios.

Potential outliers were identified by the outlier tests, and evaluation of the Q-Q plots that revealed that the data sets have a number of samples skewed to higher concentrations, therefore, they were

not removed from the data set. It is anticipated that the estimated cancer risks and noncancer HI are not underestimated based on the even distribution of the data for several chemicals, including TCE.

Uncertainty Conclusions. The parameters used in this HHRA were selected to provide a health-protective estimate of cancer risks and noncancer health hazards that are designed to represent an RME estimate. The uncertainties are not expected to significantly underestimate exposures to the RME individual.

Ecological Risk Assessment

A screening level ecological risk assessment (SLERA) was conducted for the Site. It was determined that there are no complete ecological pathways at the Site and, therefore, the Site does not pose a risk to ecological receptors.

Basis for Action

The results of the HHRA show that the Site, for most receptors, has calculated risks higher than the cancer risk range of 10^{-4} to 10^{-6} and the noncancer goal of protection of an HI =1 for most receptors. The media of concern includes groundwater and soil gas. Multiple VOCs (TCE, vinyl chloride, cis-1,2-DCE), SVOCs (such as bis(2-ethylhexyl)phthalate), and several metals exceed the risk range and goal of protection of an HI = 1. Under a future residential and commercial scenario, potential exposures to soil gas volatilized into indoor air, are associated with risks above the risk range and noncancer hazards above the goal of protection of 1 for COCs TCE, PCE, vinyl chloride, and total xylene. The response action selected in this ROD Amendment is necessary to protect the public health or welfare or the environment from actual releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) criteria, and other guidelines, and Site-specific risk-based levels.

The following RAOs have been identified for the Site:

- Reduce to acceptable levels the risk to human health associated with potential ingestion, dermal contact with, and inhalation of VOCs in groundwater;
- Prevent LNAPL from acting as a continuing source of groundwater and soil gas contamination; and

- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and State Maximum Contaminant Levels (MCLs) on the former Mattiace Property and north of the groundwater divide.

To achieve these RAOs, EPA has identified MCLs for the Site contaminants established under the Safe Drinking Water Act in the groundwater as remediation goals for the Site. While the contaminants within the LNAPL plume and the remaining hotspots can be found in subsurface soil and groundwater, the subsurface soil alone does not pose an unacceptable risk and does not warrant its own remediation goals. Similarly, the EPA expects that, by achieving MCLs in groundwater, the risks posed by exposure to soil gas will also be addressed. However, the potential for vapor intrusion will be evaluated at the time of building construction where groundwater having a concentration of PCE, TCE or cis-1,2 DCE or their degradation products which exceed NYSDOH Drinking Water Standards (10NYCRR, Part 5, Subpart 5-1) of 5 µg/L for principal organic contaminants and with vapors derived from these contaminants in groundwater that may come to be present at significant concentrations are present within 100 feet of the potential building. Selected criteria for identified COCs is found in Table 3.

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

Remedial alternatives for the amendment to the remedy selected at the Site are summarized in this section. Detailed descriptions of the remedial alternatives for modifying the remedy and addressing the contamination associated with the Site can be found in the FS Report. The FS Report presents a total of five groundwater treatment alternatives, including a no further action alternative. The No Further Action Alternative is considered in accordance with the NCP requirements and provides a baseline for comparison with the other alternatives.

DESCRIPTION OF ALTERNATIVES

Common Elements

Several of the alternatives described below, with the exception of the no further action alternative, include common major elements which do not change significantly in scope from one alternative to another. The major elements common to the alternatives (except for the “no action” alternative) include geospatial location, groundwater and soil gas monitoring, institutional controls, natural

attenuation processes, hot spot soil excavation and disposal, and restoration of the Preserve which are discussed in further detail below.

The free and residual phase LNAPL plume in the northern portion of the Site represents the most significant continuing source of contamination to Site soils and groundwater. It is estimated that approximately 85 percent of the area covered by the LNAPL plume is located off-Property to the north (under the GCDA parcel) and northwest (under the Preserve parcel). Therefore, in order to make substantial progress towards meeting the Site RAOs, the alternatives discussed herein are primarily focused within the area of the LNAPL plume. While some alternatives include remedial activities in other areas of the Site, each of the alternatives, with the exception of the No Further Action Alternative, is focused primarily on addressing LNAPL impacts to soil and groundwater.

With the exception of the No Further Action Alternative, each of the alternatives would include groundwater and soil gas monitoring. Groundwater monitoring involves the continued monitoring of groundwater quality and water levels at the Site. The purpose of this monitoring program is to identify changes in groundwater quality as a result of groundwater remediation and natural attenuation processes and to identify restoration of the aquifer. Detailed monitoring plans will be developed in the future during the design of the amended remedy.

Institutional controls proposed under the remedial alternatives are expected to include the establishment of environmental easements or deed notices to document any residual soil contamination and, if necessary, evaluation of the need for the implementation of vapor barriers and vapor intrusion systems for any future buildings constructed on the former Mattiace Property. For those alternatives which include a vertical containment barrier, institutional controls would also be required to protect the integrity of such a barrier. Institutional controls regarding groundwater are already in place through existing well restrictions for Long Island (NY ECL 15-527) and a County ordinance prohibiting the installation of new potable wells in areas served by a public water supply. However, ECL 15-257 applies to wells with a greater than 45 gallons per minute pumping capacity and does not address the potential for use of Site groundwater for non-potable purposes. Therefore, a groundwater restriction will be necessary for prohibiting the use of groundwater at the Site until such time as the aquifer is restored beneficial use which is drinking water standards. A Site Management Plan (SMP) will be developed to ensure the effectiveness of the engineering and institutional controls is anticipated if an easement is granted, as well as to monitor the long-term performance and groundwater monitoring, periodic reviews and certifications.

While natural attenuation is not the primary remedy selected it may potentially serve as a final polishing step to achieve the final selected cleanup levels. Natural attenuation processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These *in-situ* processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. Existing data, as discussed above, indicate that natural attenuation processes at the Site are already addressing contamination present in the groundwater. Monitoring the performance of the active treatment components will be used to confirm whether the remediation levels are attained after the active remedial components have addressed the LNAPL

plume, the remaining on-Property soil hotspots, and areas of groundwater with higher contaminant concentrations. These active remedial components are expected to be effective for high-concentration areas but will become less effective at reducing contaminant concentrations for low-level areas. However, these active treatment components are expected to be enhanced by the natural attenuation processes occurring at the Site. EPA would seek to optimize the use of the active and passive components of the remedy and would not initiate performance monitoring until it is evident that enhanced natural attenuation would be as, or more, effective than the active components of the remedy at further reducing contaminant concentrations. Long-term performance monitoring of the VOC contamination transformation, which will occur as a result of the active treatment and the attenuation processes, would be used to confirm that the groundwater quality improves and the performance standards are ultimately achieved. EPA would rely on the most current EPA MNA guidance to determine the effectiveness of the natural attenuation processes at reducing the remaining low-level concentrations to achieve ARARs in a reasonable timeframe. If the performance monitoring demonstrates that conditions would not be conducive to reducing the remaining low-level concentrations in a reasonable timeframe, modifications and optimization of the active treatment components would be implemented followed by additional performance monitoring. An additional timeframe of 24 years is used for developing cost estimates associated with O&M activities, including well maintenance and groundwater monitoring of these additional attenuation processes.

Existing data indicate that areas of residual soil contamination may remain in the vadose zone above the LNAPL smear zone, or in areas where free product occurred in the soil and was then smeared across the soil when the water table fluctuated between historic high and low water table elevations (i.e., in the vicinity of soil borings SSB-3 and SSB-11). These borings are located near the existing treatment building and an existing electrical transformer, preventing the implementation of any current remedial activities relative to these soils. It is possible that the operation of existing and proposed active treatment components have already addressed or will in the near future address these soil impacts. The thermal treatment component of Alternative 5 is expected to address contamination in these areas. If ARARs for these two soil hot spots are not achieved, they will require excavation and off-site disposal to an appropriate facility that is in compliance with RCRA. The cost for the excavation and treatment/disposal of soils from these two hot spot soil areas is included in Alternatives 2 through 4 and is considered in the evaluation of these alternatives. .

In order to implement certain components of each alternative, wells will need to be installed in the Preserve. Every effort will be made to minimize the impacts to the Preserve during the construction and implementation of the selected remedy. A restoration plan that addresses any short term impacts caused by the installation of the wells will be developed in consultation with the operators of the Preserve.

Alternative 1: No Further Action

Under this alternative, the current groundwater pump and treat and SVE system would be discontinued, and no further removal or treatment of LNAPL or groundwater would be conducted. This alternative would not reach RAOs in a reasonable time frame.

<i>Capital Cost:</i>	\$0
<i>Annual O&M Costs:</i>	\$0
<i>Present-Worth Cost:</i>	\$0

Alternative 2: Existing Dual Phase/SVE and Groundwater Remediation Systems

This remedial alternative involves an expansion of the existing dual phase/SVE and groundwater remediation systems to provide greater coverage of the LNAPL and groundwater plumes to the north and west of the former Mattiace Property. Both soil vapor and groundwater extraction systems would be expanded. Additional soil vapor and groundwater extraction wells would be installed, along with the associated piping to convey the soil vapor and groundwater to the existing treatment building. This alternative also includes common elements described above. For cost estimating purposes, this alternative is estimated to take at least 74 years to reach RAOs through at least 50 years of groundwater pumping and treatment and SVE system operations followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$3.2 Million
<i>Annual O&M Costs:</i>	\$12.2 Million
<i>Present-Worth Cost:</i>	\$18.5 Million

Alternative 3a: Air Sparging

Air sparging is a treatment process that uses injected air to remove volatile or biodegradable contaminants from the saturated zone of an aquifer. Air is injected directly into the saturated zone transferring VOCs from the dissolved phase or LNAPL to the vapor phase through an air stripping process. The stripped compounds would then be biodegraded and/or removed via SVE in the vadose zone. This alternative would require the construction and implementation of an air sparging system, including the installation of numerous air sparge wells on the former Mattiace Property and in the areas north and west of the former Mattiace Property on the Preserve parcel. Air compressors, blowers, piping, and associated control systems would be required to inject and withdraw the air from the subsurface. The existing soil vapor treatment system could be used to treat the extracted soil gas although it would have to be expanded to handle the additional air flow. Operation of the existing groundwater pump-and-treat system would cease. This alternative also includes common elements as described above. For cost estimating purposes, this alternative is estimated to take 44 years to reach RAOs, through 10 years of operating the air sparge system, 10 years to allow aquifer to return to highly reduced conditions, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$12.8 Million
<i>Annual O&M Costs:</i>	\$4.4 Million
<i>Present-Worth Costs:</i>	\$20.7 Million

Alternative 3b: Air Sparging with Partial Containment

This alternative is the same as Alternative 3a with the addition of partial containment. A vertical containment system, involving a slurry wall and/or sheet pile wall, would be installed to provide

additional control of the potential migration of contamination in areas where the depth to the nearest subsurface clay layer is sufficiently shallow to support the use of these containment technologies. The barrier would limit the future migration of both impacted groundwater and soil gas away from the former Mattiace Property. The use of vertical containment would be limited to the general former Mattiace Property boundaries adjacent to developed properties (i.e., to the east, south, and west of the Property), to limit potential migration in these directions during and after remedy implementation. The depth of the underlying clay would limit the feasibility of containment in the areas to the north and northwest of the former Mattiace Property. For cost-estimating purposes, this alternative is estimated to take 44 years to reach RAOs, through 10 years of operating the air sparge system, 10 years for the aquifer to return to highly reduced conditions, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$13.4 Million
<i>Annual O&M Costs:</i>	\$4.4 Million
<i>Present-Worth Cost:</i>	\$21.5 Million

Alternative 4a: Bioremediation of LNAPL through Bioventing and Performance Monitoring of Groundwater

Alternative 4a includes bioremediation of LNAPL through the installation of a bioventing system. Bioventing involves the vacuum-induced flow of air (oxygen) into the subsurface to facilitate aerobic microbial biodegradation. Bioventing utilizes lower airflow rates than SVE, thereby providing only enough oxygen to sustain microbial activity (i.e., it is not intended to air-strip contaminants from soil). As the air moves through the biologically active soil, biodegradation treats the VOCs that are adsorbed to the vadose zone soils and the VOCs in the soil vapor. Bioventing would be used in the LNAPL plume, where it would be expected to enhance aerobic biological degradation of hydrocarbons present in the LNAPL and the associated vadose portion of the smear zone. The biological degradation process produces fatty acids that, in turn, could be used by the anaerobic bacteria that are already present in the groundwater to continue the natural degradation of the chlorinated VOCs in the groundwater and the saturated portion of the smear zone.

Implementation of this alternative would require the construction and implementation of a bioventing system in the LNAPL area on the former Mattiace Property and to the north and west of the Property. Air extraction wells, air intake vent wells, blowers to extract air, piping, and associated control systems would be required to inject and withdraw the air from the subsurface. To minimize the potential impacts to the Preserve property, this alternative includes the use of horizontally-drilled bioventing vapor extraction wells. The extraction wells would be drilled horizontally from the former Mattiace Property and extend to beneath the Preserve. The existing SVE system would be used to treat the extracted vapors. Additionally, the operation of the existing soil vapor extraction system would be continued in the areas of SSB-03 and SSB-11 to address the shallow soil contamination in these two areas. A new SVE well would be installed at each of these locations. Under this alternative, operation of the existing groundwater pump-and-treat system would be discontinued.

This alternative also includes the common elements as described above. For cost-estimating purposes, this alternative is estimated to take 55 years to reach RAOs, through 5 years of operating the bioventing system and an estimated 50 years of performance monitoring.

<i>Capital Cost:</i>	\$1.7 Million
<i>Annual O&M Costs:</i>	\$1.1 Million
<i>Present-Worth Cost:</i>	\$3.3 Million

Alternative 4b: Bioremediation of LNAPL and Enhanced Bioremediation of Groundwater

Alternative 4b differs from Alternative 4a in that it adds enhanced reductive bioremediation for groundwater remediation. In areas of the Site where existing conditions are not conducive to optimal anaerobic bioremediation rates (e.g., low pH, lack of sulfate, or presence of aerobic groundwater conditions), substances would be selected and introduced to the aquifer/groundwater to change these limiting conditions. The substances, referred to as amendments, which are anticipated to be used initially are sulfate and lactate. Amendments would be delivered to these areas either through subsurface injection at temporary injection points, injection wells, or modified venting wells. For cost-estimating purposes, this alternative is estimated to take 33 years to reach RAOs through 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$1.7 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$5.2 Million

Alternative 4c: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with Partial Containment

Alternative 4c includes Alternative 4b with the addition of a vertical containment system, involving a slurry wall and/or sheet pile wall to provide additional control of the potential future subsurface migration of contamination in areas where the depth to a subsurface clay layer is sufficiently shallow to support the use of these containment technologies. The barrier would limit future migration of both impacted groundwater and soil gas away from the former Mattiace Property to adjacent properties to the west, south, and east. For cost-estimating purposes, this alternative is estimated to take 33 years to reach RAOs, through 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$2.3 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$5.9 Million

Alternative 4d: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with Partial Containment and Hydraulic Control

This alternative includes all of Alternative 4c and adds the use of groups of trees and their root system, known as phytoremediation, as a supplemental hydraulic control measure to the containment provided by the vertical containment system. Phytoremediation uses of the trees' root systems to absorb groundwater and thus reduce the flow and contain the spread of groundwater contamination at a site. It would be implemented in the southern portion of the former Mattiace Property for hydraulic control in order to maintain water levels behind the vertical barrier. Phytoremediation in this area was evaluated and groundwater flux calculations provided the bases for the proposed use of 75 willow, poplar, and/or cottonwood trees. While it is intended that phytoremediation would be utilized primarily for hydraulic control, in the southern portion of the former Mattiace Property, it may also provide phytoremediation of groundwater contamination. For cost-estimating purposes, this alternative is estimated to take 33 years to reach RAOs, through 5 years of operating the bioventing system, and 9 years of enhanced bioremediation injections, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$2.5 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$6.2 Million

Alternative 5a: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with *In-Situ* Thermal Treatment of Hot Spots on the former Mattiace Property

Alternative 5a is identical to Alternative 4b, with the addition of *in-situ* thermal treatment of the soil and groundwater hot spots present at the former Mattiace Property and the elimination of the potential hot spots by performing soil excavations. *In-situ* thermal treatment can be used to treat subsurface soil, free-phase LNAPL, and, in some cases, nearby groundwater. It involves the heating of subsurface materials to high temperatures, which vaporizes contaminants. These vapors are collected and treated after extraction. *In-situ* thermal treatment would be focused on hot spot areas on the Property. One possible method would consist of electrical resistance heating, which uses arrays of electrodes to create a concentrated flow of current towards a central neutral electrode. Resistance to flow in the soils generates heat greater than 100°C, producing steam and readily mobilizing contaminants. The implementation would require the installation of subsurface electrodes in the hot spot treatment areas.

This alternative also includes the common elements as described above. For cost-estimating purposes, this alternative is estimated to take 34 years to reach RAOs, through 1 year of thermal treatment, 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$5.2 Million
<i>Annual O&M Costs:</i>	\$3.3 Million
<i>Present-Worth Cost:</i>	\$10.3 Million

Alternative 5b: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater, *In-Situ* Thermal Treatment of Hot Spots on the former

Mattiace Property, Partial Vertical Containment Barrier and Hydraulic Control via Phytoremediation

Alternative 5b includes the components of Alternative 5a, with the addition of a partial vertical containment barrier and phytoremediation. The partial vertical containment barrier would provide additional control of the potential future migration of contamination during remedial implementation in areas where the depth to the subsurface clay layer is sufficiently shallow to support the use of this containment technology. The barrier would prevent the future migration of impacted groundwater and vapors to the west, south, and east to adjacent properties. Alternative 5b also includes the use of phytoremediation as a supplemental hydraulic control measure to maintain water levels behind the partial vertical containment barrier. The existing groundwater extraction and treatment system would be restarted if further hydraulic control of groundwater migration to the northwest is necessary or if water levels behind the partial vertical barrier are not maintained through the trees' root systems. For cost-estimating purposes, this alternative is estimated to take 34 years to reach RAOs, through 1 year of thermal treatment, 5 years of operating the bioventing system, and 9 years of enhanced bioremediation injections, followed by an estimated 24 years of performance monitoring.

<i>Capital Cost:</i>	\$ 6.0 Million
<i>Annual O&M Costs:</i>	\$ 3.3 Million
<i>Present-Worth Cost:</i>	\$ 11.2 Million

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting or amending a remedy, EPA considers the factors set out in Section 121 of CERCLA, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial alternatives in accordance with the NCP, 40 CFR § 300.430(e)(9)(iii), and Office of Solid Waste and Emergency Response Directive 9355.3-01. The detailed analysis consists of an assessment of each alternative against nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls, and
2. *Compliance with ARARs* addresses whether a remedy would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Federal or state advisories, criteria, or guidance are TBCs. TBCs are not required to be complied with by the NCP, but the NCP recognizes that they may be very useful in determining what is protective at a site or how to carry out certain actions or requirements.

The following "primary balancing" criteria are used to make comparisons and to identify the major tradeoffs among alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once performance standards are attained. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes remaining at a site;
4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ;
5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until performance standards are attained;
6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option; and
7. *Cost* includes estimated capital, O&M, and present-worth costs of each alternative.

The following "modifying" criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. *State acceptance* indicates whether, based on its review of the RI/FS report, Human Health and Ecological Risk Assessment, and Proposed Plan, the State concurs with, opposes, or has no comments on the proposed remedy; and
9. *Community acceptance* refers to the public's general response to the alternatives described in the RI/FS report, Human Health and Ecological Risk Assessment, and Proposed Plan.

As follows, the evaluation criteria noted above are used in a comparative analysis of the alternatives considered in this ROD.

1. Overall Protection of Human Health and the Environment

Each of the alternatives evaluated except Alternative 1: No Further Action, would provide protection of human health and the environment. Alternatives 2, 3, 4, and 5 are protective over the short-term through institutional controls and over the long-term through active remedial measures. Because Alternative 1: No Further Action is not protective of human health and environment and fails to meet either of the "threshold" criteria, it was eliminated from consideration under the remaining evaluation criteria.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Under the New York regulations, the aquifer is classified as Class GA (6 NYCRR 701.18), meaning that it is designated as a potable water supply. Therefore, attaining MCLs as established

under the Safe Drinking Water Act for Site contaminants in the groundwater is an ARAR for the Site.

Federal and State chemical-specific ARARs include the aforementioned MCLs (40 CFR Part 141.11-16 and 141.61-64), New York State MCLs (10 NYCRR 5-1.52), and New York Groundwater Quality Standards (6 NYCRR 703), which are all enforceable standards for various Site-related drinking water contaminants (chemical-specific ARARs). If more than one such requirement applies to a contaminant, compliance with the more stringent requirement is required. Groundwater TBCs include federal secondary MCLs and groundwater quality guidance values established in New York's Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 based on the GA groundwater classification. Selected criteria for iron and manganese include calculated concentrations based on risk to human health rather than secondary MCLs, which are based on aesthetics. See Table 3, attached, which identifies the chemical-specific ARARs selected for the COCs at the Site.

No chemical-specific ARARs were identified for soil vapor COCs. Chemical-specific soil gas TBCs consist of EPA's Vapor Intrusion Screening Levels.

Each of the action alternatives would comply with action-specific ARARs. ARARs are attached in Table 4.

3. Long-Term Effectiveness and Permanence

Alternatives 2 and 3 would provide long-term protectiveness against potential exposures through the use of active groundwater and soil gas treatment. Alternative 4 would provide long-term protection against potential exposures through treatment of LNAPL, its residuals, and soil. Alternatives 3b, 4c, 4d and 5b would provide an added element of long-term control of migration of impacted groundwater. All of the alternative treatment methods would provide a permanent reduction in the toxicity of the VOC contaminants. Long-term groundwater and soil gas monitoring would be required for all alternatives. Alternative 5 would provide the permanency with respect to hot spot treatments. Long-term effectiveness could be affected by geologic conditions in Alternatives 2, 3, 4, and 5. Alternatives 4 and 5 would require periodic injections of amendments. Each alternative would require five-year reviews until performance standards are achieved.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 2 addresses contamination through extraction and treatment of groundwater, SVE, and performance monitoring. The system will reduce mobility and toxicity of contaminants, but reductions in the rate of VOC recovery, because of mass transfer limitations observed under the existing remedial system, suggest that similar results would be expected for an expanded system, thereby reducing the probability of attainment of remediation levels. Alternative 3a addresses contamination through the air sparging and SVE systems. The vapor treatment will reduce toxicity of contaminants. It will likely be more effective than Alternative 2, but attainment of remediation levels in groundwater could be complicated by a drop-off in the rate contaminants are removed over time and the elimination of existing anaerobic biodegradation processes because of the

introduction of aerobic conditions into the saturated zone. Alternative 3b is comparable to 3a, but it further reduces mobility of contaminants. Alternatives 4a-d should be more effective than 2 and 3a-b by addressing contamination through bioventing and performance monitoring. The toxicity of soil vapor, LNAPL, and groundwater contaminants should be reduced by *in-situ* biodegradation processes, and the vapor treatment system would reduce the toxicity of contaminants in extracted soil vapor. Treatment relies on biological degradation of contaminants rather than on processes governed by mass transfer rates. Alternatives 4b, 4c, 4d, 5a, and 5b would optimize the naturally occurring anaerobic biodegradation in groundwater through the injection of materials that would facilitate or enhance biodegradation and accelerate the natural biodegradation process. Phytoremediation in Alternatives 4d and 5b would add protection against migration of impacted groundwater over much of the former Mattiace Property and provide additional hydraulic control, as well as some potential treatment of contaminants on the former Mattiace Property south of the groundwater divide. Alternatives 5a and 5b are comparable to 4b but would provide added protection against impacted groundwater on the Property and to the south and east as it would further reduce concentrations of contaminants in hot spot areas on the former Mattiace Property through thermal treatment. The thermal component of Alternatives 5a and 5b would increase treatment of COCs beneath the former Mattiace Property.

Alternatives 2-5 would provide a reduction in the mobility and toxicity of subsurface contaminants. Alternative 2 would achieve this through groundwater and soil vapor extraction and treatment processes while alternative 3, 4 and 5 would extract and treat solely soil vapor. Alternatives 4d and 5b may also provide additional treatment and a reduction in the mobility of subsurface contaminants south of the groundwater divide through the phytoremediation system. Groundwater mounding during air sparging in Alternative 3 could cause a temporary increase in the mobility of LNAPL and impacted groundwater. Alternative 5 also would provide additional treatment and an increased level of reduced mobility of contaminants through thermal treatment of hot spots on the former Mattiace Property.

5. Short-Term Effectiveness

Alternatives 2, 3a-b, 4a-d, and 5a-b are anticipated to have minimal short-term impacts to remediation workers, the public, and the environment associated with the implementation of the alternatives. Alternatives 2, 3a-b, 4a-d, and 5a-b would require some components of the remedial systems to be located on the Preserve. These components would require some continued access for future maintenance after implementation. Additionally, installing remedial components on the Preserve property would adversely impact existing vegetation. Alternatives 4, 5a, and 5b would reduce the extent of off-Property construction and short-term impacts to the Preserve by using horizontally drilled bioventing wells under the Preserve property installed from locations on the former Mattiace Property. Each alternative can be implemented in the short-term, but long-term operation and performance monitoring period would be required to achieve RAOs. The treatment period for Alternatives 3a-b would likely be shorter than that of Alternative 2, and the treatment period of Alternative 4a-d would likely be shorter than both 2 and 3a-b as biological degradation processes do not rely on mass transfer processes. The addition of enhanced biodegradation injections in alternatives 4b, 4c, 4d, 5a and 5b would likely further reduce the treatment period. The vertical barrier component in alternatives 3b, 4c 4d, and 5b would have an immediate impact on groundwater flow. Phytoremediation in Alternatives 4d and 5b would provide immediate

results, with the effectiveness of the system increasing over time as the root system becomes more developed. The thermal treatment associated with Alternatives 5a and 5b would have an immediate impact on the soil and groundwater concentrations in hot spots on the former Mattiace Property. Construction of the remedial components for each alternative could result in some short term exposures to the remediation worker and will be addressed in the Site Health and Safety Plan which will be prepared or amended during design of the selected remedy.

6. Implementability

All technologies under Alternatives 2, 3a-b, 4a-d, and 5a-b are established technologies with commercially available equipment and are readily implementable. However, the design of Alternatives 3, 4, and 5 could be complicated by heterogeneous subsurface conditions. Each Alternative would require access to off-Property locations, including some clearing of portions of the adjacent Preserve, however, the incorporation of horizontal wells in Alternatives 4a-d and 5a-b would significantly limit these impacts. The alternatives (other than the “no action” alternative) would utilize the existing soil vapor treatment system, with expansion of the SVE system as needed. Historically, electrical service has been unreliable at the Site. Alternative 3 would require significant electrical power, while Alternatives 4 and 5 would require less. Alternatives 1, 2, 4a, and 4b would not limit the implementability of other remedial actions, if they are required in the future. Alternative 3a would not limit implementability of other remedial actions unless biofouling of the formation reduces its permeability. Alternative 3b, 4c, 4d, and 5b could limit the implementability of other remedial actions, as the barrier would change the hydrogeologic conditions at the Site. Additionally, the presence of trees in the southern portion of the Property as envisioned in Alternative 4d and 5b would impact the implementability of other remedial actions in that area. Alternatives 3b, 4c, and 4d require additional engineering analysis during design to determine the appropriate barrier technology. Variable depth to underlying clay could complicate installation. The barrier placed close to the retaining walls on the property borders could also create geotechnical issues, and where the barrier extends off-Property, access to adjacent properties and institutional controls would be required. Alternative 4d and 5b would require maintenance of trees. Alternatives 4d, 5a, and 5b require disposal of waste materials generated during system construction. Additional engineering analysis would be required to determine appropriate thermal treatment system placement for both Alternative 5a and 5b, but the thermal treatment would be conducted only on the former Mattiace Property, so access and impacts beyond the Property would not be an issue.

7. Cost

The estimated capital costs, O&M costs, and present-worth costs are discussed in detail in the FS Report. The cost estimates are based on the best available information. It is estimated that the O&M for Alternative 2 will be 50 years, 10 years for Alternative 3, 5 years for bioventing and 9 years for enhanced bioremediation components of Alternatives 4 and 5, and 1 year for thermal treatment component in Alternative 5. After active treatment an additional 24-50 years is estimated for performance monitoring to achieve ARARs. The costs for each of the alternatives are presented below. The highest present-worth cost alternative is Alternative 3, at \$21.5 million.

Table 1: Summary of Alternatives Cost

Alternative	Capital Cost	O&M Cost	Total Present Worth	Total Present Worth with Contingency¹
Alternative 1	\$0	\$0	\$0	\$0
Alternative 2	\$3.2 M	\$12.2 M	\$15.4 M	\$18.5 M
Alternative 3a	\$12.8 M	\$4.4 M	\$17.2 M	\$20.7 M
Alternative 3b	\$13.4 M	\$4.4 M	\$17.8 M	\$21.5 M
Alternative 4a	\$1.7 M	\$1.1 M	\$2.8 M	\$3.3 M
Alternative 4b	\$1.7 M	\$2.7 M	\$4.4 M	\$5.2 M
Alternative 4c	\$2.3 M	\$2.7 M	\$5.0 M	\$5.9 M
Alternative 4d	\$2.5 M	\$2.7 M	\$5.2 M	\$6.2 M
Alternative 5a	\$5.2 M	\$3.3 M	\$8.5 M	\$10.3 M
Alternative 5b	\$6.0 M	\$3.3 M	\$9.3 M	\$11.2 M

¹ A 20 percent contingency was added to the total present-worth costs for uncertainties associated with estimating costs

² A discount rate of 7% was used in calculating costs.

8. State/Support Agency Acceptance

NYSDEC concurs with the amended remedy. A letter of concurrence is attached. (See Appendix IV)

9. Community Acceptance

EPA solicited input from the community on the remedial alternatives proposed for the Site and received oral and written comments. The attached Responsiveness Summary addresses the comments received during the public comment period (see Appendix V). Based on the comments received, the community supports the remedial alternatives which comprise this proposed amendment to the remedy.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The “principal threat” concept is applied to the characterization of “source materials” at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants

that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy-selection criteria set forth above and described in more detail below. This analysis provides a basis for making a statutory finding that the amended remedy employs treatment as a principal element.

Data from a source-area investigation revealed locations which are acting as large LNAPL source areas. These source areas, which are a significant reservoir for the migration of contamination to groundwater (and therefore constitute a “principal threat waste”), will be addressed under the amended remedy.

AMENDED REMEDY

Summary of the Rationale for the Amended Remedy

Based upon the requirements of CERCLA, the results of the Site investigations, the detailed analysis of the alternatives, and public comments, EPA has determined that the following alternative satisfies the requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP’s nine evaluation criteria, 40 CFR § 300.430(e)(9), as described below:

Alternative 5b: Bioremediation of LNAPL Through Bioventing and Enhanced Bioremediation of Groundwater, *In-Situ* Thermal Treatment of Soil and Groundwater Hot Spots, Partial Vertical Containment and Hydraulic Control via Phytoremediation.

EPA intends that monitoring of the performance of the active treatment components will confirm that the remediation levels will be attained after the active remedial components have addressed the LNAPL plume, the remaining on-Property soil hotspots, and areas of groundwater with higher contaminant concentrations. These active remedial components are expected to be effective for high-concentration areas, but they will be less effective at reducing contaminant concentrations for low-level areas. However, these active treatment components are expected to facilitate and expedite the natural attenuation processes occurring at the Site. EPA would seek to optimize the use of the active and passive components of the remedy and would not rely upon performance monitoring until it is evident that enhanced natural attenuation would be as or more effective than the active components of the remedy at further reducing contaminant concentrations. Long-term performance monitoring of the effect of the active treatment and the attenuation processes on VOC contamination will be used to confirm that the groundwater quality continues to improve until the performance standards identified are achieved. EPA will rely on the most current EPA MNA guidance to determine the effectiveness of the natural attenuation processes at reducing the remaining low-level concentrations to achieve ARARs in the timeframe anticipated to achieve cleanup levels which is 34 years. If the performance monitoring demonstrates that conditions would not be effective at reducing the remaining low-level concentrations in the timeframe expected, the remedy will be, modified and optimized to improve performance before achieving

the final low level contamination reduction using performance monitoring. The modifications and enhancements include: enhanced bioremediation treatment component, including location, frequency, and duration of bioremediation amendment injections, would be implemented followed by additional performance monitoring. Data indicates that metals mobilization is occurring from the presence of organics in the aquifer. It is anticipated that the metals concentrations will decrease after the aquifer returns to its natural state after the bioremediation addresses organics contamination. An operations and maintenance (O&M) time of 24 years after the initial 10 years of active remediation is estimated to fully achieve cleanup levels. O&M activities, include well maintenance and groundwater monitoring of these additional attenuation processes.

The amended remedy is expected to achieve MCLs in a reasonable timeframe of 34 years. Long-term groundwater monitoring will be performed to track progress towards ensuring that RAOs are achieved and maintained.

Description of the Amended Remedy

The selected remedy includes the following key components:

- Discontinuance of the operation of the existing groundwater pump and treat system;
- Bioventing the residual source of contamination to groundwater, which consists of both free-phase LNAPL and LNAPL in the smear zone on the former Mattiace facility Property and extending west northwest onto the Nassau County Garvies Point Preserve property (Preserve). This remedy component will require the installation of new horizontal bioventing wells that would be connected to the existing vapor treatment system;
- *In-situ* thermal treatment of contaminated soil and nearby groundwater in "hot spot" areas of known elevated soil and groundwater contamination on the former Mattiace facility Property;
- Enhanced reductive bioremediation, utilizing vertical injection wells, in areas of the former Mattiace facility Property where thermal treatment does not address contamination and in the Preserve areas where elevated concentrations of VOCs have been detected in groundwater;
- Installation of a partial vertical containment barrier (e.g. slurry wall and/or sheet pile wall) along the former Mattiace facility Property line, with the exception of the area north and west, where the depth to the underlying clay layer deepens and where NAPL is present;
- Hydraulic control, via phytoremediation, to address the potential increase in water levels on the southern portion of the former Mattiace facility Property behind the partial vertical barrier;
- Performance monitoring of groundwater to evaluate the effects of active remedial components on natural attenuation processes, to determine if contaminant migration is controlled, to monitor changes in the VOC contaminants over time, and to ensure the RAOs are achieved;
- Implementation of institutional controls that will include the establishment of an environmental easement/restrictive covenants to be filed in the property records of Nassau County until such time that RAOs are attained. The institutional controls will: prevent inappropriate withdrawals of groundwater; require evaluation of the need for vapor barriers and vapor intrusion systems for any future buildings that may be constructed on the former

- Mattiace facility Property; and prevent activities or uses of the property that might interfere with any of the treatment systems (including the barrier wall) that are in place at the Site;
- Development of an SMP to ensure the effectiveness of the engineering and institutional controls, as well as the long-term performance and groundwater monitoring, periodic reviews and certifications; and
 - Development of a restoration plan for the Preserve.

The objective of the bioventing system is to remediate the residual source of groundwater contamination, both free phase LNAPL and LNAPL present in the smear zone. Refer to Figure 16 for locations of remedial components of the selected remedy. The bioventing system will be designed and installed to introduce oxygen and remove carbon dioxide from the defined residual LNAPL smear zone. Horizontal extraction and vertical air inlet wells will be designed to be installed in the permeable zone at the top portion of the water table that contains the majority of the residual LNAPL and smear zones. Air will be withdrawn from the vadose zone under a low vacuum, which introduces air flow from the vertical air inlet wells into the horizontal extraction wells. The air provides oxygen for microbial activity in the vadose and smear zones and accelerates the aerobic degradation of the LNAPL and residual organic COCs. The operation of the bioventing system will be designed to remove the chlorinated VOCs either as vapors with the extracted air or by dissolving them into the groundwater, where they will be degraded by anaerobic bacteria. The conditions at the Site indicate that anaerobic biodegradation is currently occurring in groundwater. The vadose zone above the groundwater would not impact these conditions significantly, as the microbes in the vadose zone above the groundwater will consume oxygen before the VOCs can diffuse into the groundwater.

The enhanced reductive bioremediation system, consisting of vertical injection wells, will be constructed in the Preserve areas where elevated concentrations of VOCs have been detected in groundwater. Vertical injection bioremediation wells would be placed on the former Mattiace Property in areas where residual contamination remains after thermal treatment to address the remaining contamination in a reasonable timeframe. Vertical air inlet wells installed as part of the bioventing system will be situated at depths below the water table and also be utilized for the injection of the bioremediation amendments. The wells will be screened both above and below the water table with packers installed to seal the well from the water table during operation of the bioventing system. Additionally, temporary injection points will be installed by direct push technology that will be utilized in the southern portion of the former Mattiace Property for the injection of amendments. Enhanced reductive bioremediation involves the injection of a carbon source, electron donors, pH buffer, or microbes, as needed, to facilitate or optimize the anaerobic degradation of hydrocarbons and chlorinated hydrocarbons in groundwater. The type of amendment, duration, and frequency of injections and monitoring will be determined during design.

In-situ thermal treatment methods will be used to heat contaminated soil and nearby groundwater to very high temperatures. The heat vaporizes the chemicals and water changing them into gases. These vapors can move more easily through soil. The heating process can make it easier to remove NAPLs from both soil and groundwater. High temperatures will also destroy some chemicals in the area being heated. Thermal treatment will be used in "hot spot" areas of known elevated soil and groundwater contamination on the former Mattiace Property (i.e., the southeast, east, and

northern portions; see Figure 16). Gasses produced by the thermal treatment will be captured with soil vapor extraction wells and treated.

A partial vertical containment barrier will be provided along the former Mattiace Property line, with the exception of the boundary line to the north and west where the depth to the underlying clay layer deepens and where NAPL is present. The type of containment system (i.e., slurry wall and/or sheet pile wall) will be determined based on further engineering analysis during design. Groundwater north of the vertical containment on the portion of the Property south of the clay mound would rise to an elevation that would cause it to flow over the clay mound to the north/northwest. By providing vertical containment along the Property line, groundwater contamination will be prevented from migrating from the general Property area in all directions except to the northwest, where the bioventing and bioremediation systems will provide active treatment of contamination.

Phytoremediation will be added in the southern portion of the former Mattiace Property to extract groundwater so as to provide hydraulic control of the increased water table elevation that will result from the partial vertical containment barrier. The phytoremediation component will be designed to ensure that the proposed system manages the increased water table elevation south of the groundwater divide that would result from the presence of the partial vertical containment barrier. Wells in the southern property area could also be pumped with the existing groundwater pump and treat system if it is determined through monitoring that the trees' root systems are not sufficiently maintaining water levels. The phytoremediation system may also extract some VOC contaminants from the southern portion of the Property. Appropriate tree species will be chosen because of their robustness, ability to extract large amounts of water, rapid growth potential, and water-seeking root growth.

Institutional controls will be incorporated in the amended remedy. They will include, if feasible, the establishment of an environmental easement and a deed restriction to document remaining soil contamination. If necessary, the controls may also include a requirement that an evaluation is performed of the need for vapor barriers and vapor intrusion systems for any future buildings constructed on the former Mattiace Property while contamination remains. The potential for vapor intrusion will be evaluated at the time of building construction where groundwater having a concentration of PCE, TCE or cis-1,2 DCE or their degradation products which exceed NYSDOH Drinking Water Standards (10NYCRR, Part 5, Subpart 5-1) of 5 µg/L for principal organic contaminants and with vapors derived from these contaminants in groundwater that may come to be present at significant concentrations are present within 100 feet of the potential building. Institutional controls will also be required to protect the integrity of a vertical containment barrier system and to prevent the withdrawal and use of Site-related groundwater in the short-term until groundwater cleanup levels are achieved. . Substantive restrictions on groundwater are already in place through existing well restriction regulations for Long Island (NY ECL 15-527), and a Nassau County ordinance exists which prohibits the installation of new potable wells in areas served by a public water supply. However, because the ordinance applies to wells with greater than 45 gallons per minute of pumping capacity and does not address the potential for non-potable use of on-Site groundwater, additional Site-specific institutional controls limiting any well installation will be sought for at least the Property. Development of a SMP to ensure the effectiveness of the engineering and institutional controls may also be appropriate if an easement is granted, as well as

to monitor the long-term performance and groundwater monitoring, periodic reviews and certifications.

A restoration plan for any adverse impacts to the Preserve as a result of cleanup activities during the implementation of the amended remedy will also be developed as part of the amended remedy.

Additionally, performance monitoring will be performed to confirm the effectiveness of the active treatment components and their ability to enhance the naturally occurring degradation processes to address low-level residual groundwater contamination. A long-term groundwater monitoring program will be developed and implemented to track and monitor changes in the groundwater contamination. The results from the long-term monitoring program will be used to evaluate if contaminant migration is occurring, to monitor changes in the VOC contaminants over time, and to ensure the RAOs are achieved. Data indicates that metals mobilization is occurring from the presence and degradation of organics in the aquifer. It is anticipated that the metals concentrations will decrease after the aquifer returns to its natural state after the bioremediation addresses organics contamination.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy 13. This will include consideration of green remediation technologies and practices.

While this alternative will ultimately result in reduction of contaminant levels in groundwater to levels that would allow for unlimited use and unrestricted exposure, it will take longer than five years to achieve these levels. As a result, in accordance with the EPA policy, the Site will be reviewed at least once every five years until such time as performance standards are attained and human health and the environment are protected with unrestricted use.

Summary of the Estimated Remedy Costs

The estimated capital, O&M, and total present-worth cost of the EPA's amended remedy, which include a 7 percent discount rate, are \$6.0 million, \$3.3 million, and \$11.2 million, respectively. Table 5 provides the basis for the cost estimates for Alternative 5b.

It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the amended remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

Expected Outcomes of the Amended Remedy

The amended remedy addresses the contamination identified during the SRI/SFS in the groundwater and soil gas at the Site. The results of the risk assessment indicate that future use of groundwater at the Site will pose an unacceptable increased future cancer risk and an unacceptable non-cancer hazard risk to human health if no action is taken. The amended remedy will be used

to remediate contaminated groundwater and will restore the aquifer as a potential source of drinking water in a reasonable time period by reducing contaminant levels to the federal MCLs and State standards.

STATUTORY DETERMINATIONS

As noted above, Section 121(b)(1) of CERCLA mandates that a remedial action must be protective to human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. Section 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4). For the reasons discussed below, EPA has determined that the amended remedy meets the requirements of Section 121 of CERCLA.

Protection of Human Health and the Environment

The amended remedy will protect human health and the environment because it will restore groundwater quality at the Site to drinking-water standards over the long-term. Cleanup levels are estimated to be achieved in 34 years. Institutional controls will also assist in protecting human health and the environment over both the short and long-term by helping to control and limit exposure to hazardous substances. ICs will not be needed once cleanup levels have been achieved.

Compliance with ARARs

The amended remedy is expected to achieve federal MCLs or more stringent State standards for the contaminants of concern in the groundwater. The selected cleanup level for iron and manganese are not the secondary MCLs, or concentrations that are based on aesthetics, but rather concentrations that were calculated based on risk to human health. Data indicates that metals mobilization is occurring from the presence and degradation of organics in the aquifer. It is anticipated that the metals concentrations will decrease after the aquifer returns to its natural state after the bioremediation addresses organics contamination. The COCs and the relevant selected cleanup levels are as follows: 2-butanone (50 µg/l); chloroform (7 µg/l); cis-1,2-dichloroethene (5 µg/l); 1,2-dichlorobenzene (3 µg/l); 1,2-dichloroethane (0.6 µg/l); dichloromethane (5 µg/l); ethylbenzene (5 µg/l); PCE (5 µg/l); 1,1,1-trichloroethane (5 µg/l); TCE (5 µg/l); vinyl chloride (2 µg/l); 1,1-dichloroethane (5 ug/L); 1,4-dichlorobenzene (3 ug/L); benzene (1 ug/L); toluene (5 ug/L); total xylene (5 µg/l); bis(2-ethylhexylphthalate) (5 ug/L); napthalene (10 µg/l); 4,4'-DDD (0.3 ug/L); arsenic (10 ug/L); cadmium (5 ug/L); cobalt (5 ug/L); iron (14,000 ug/L); nickel (100 ug/L); and manganese (430 µg/l).

See also Table 3 for a list of all remediation levels for COCs. A full listing of the ARARs, TBCs, and other guidelines for implementation of the amended remedy is presented at Tables 4-a, Table 4-b and Table 4-c.

Cost-Effectiveness

A cost-effective remedy is one which has costs that are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall, effectiveness is based on the evaluations of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. EPA evaluated the “overall effectiveness” of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to those alternatives’ costs to determine cost-effectiveness.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, O&M costs were calculated for the estimated life of each alternative. The total estimated present-worth cost for implementing the amended remedy is \$11.2 million.

Based on the comparison of overall effectiveness to cost, the amended remedy meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f)(1)(ii)(D)) in that it is the least-costly alternative which will achieve groundwater standards within a reasonable time frame. The results of the analysis support the use for planning and estimating purposes of an estimate of a 34-year timeframe to remediate groundwater, although remediation timeframes could exceed or be shorter in duration than this estimate.

Preference for Treatment as a Principal Element

By using a combination of alternatives, to the maximum extent practicable, the statutory preference for remedies that employ treatment as a principal element is satisfied through the use of a bioventing system in the LNAPL area, enhanced bioremediation of the contaminated groundwater, and *in-situ* thermal treatment of on-Property soil and groundwater hot spots.

Five-Year Review Requirements

This remedy will not result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that would allow for unlimited use and unrestricted exposure. However, because it may take more than five years to attain the remediation goals, pursuant to Section 121(c) of CERCLA, policy reviews will be conducted no less often than once every five years after the completion of construction to ensure that the remedy is, or will be, protective of human health and environment until such time as unlimited use and unrestricted exposure pose no threat to human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The preferred amendment to the remedy as identified in the Proposed Plan, which was released for public comment on April 17, 2014, was Alternative 5b: Bioremediation of LNAPL Through Bioventing and Enhanced Bioremediation of Groundwater, *In-Situ* Thermal Treatment of Soil and

Groundwater Hot Spots, Partial Vertical Containment and Hydraulic Control via Phytoremediation. The comment period closed on May 19, 2014.

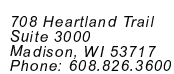
In response to the community input, EPA determined that no modifications to the remedy presented in the Proposed Plan are warranted.

APPENDIX I

Figures


 1" = 2,000'
 1:24,000

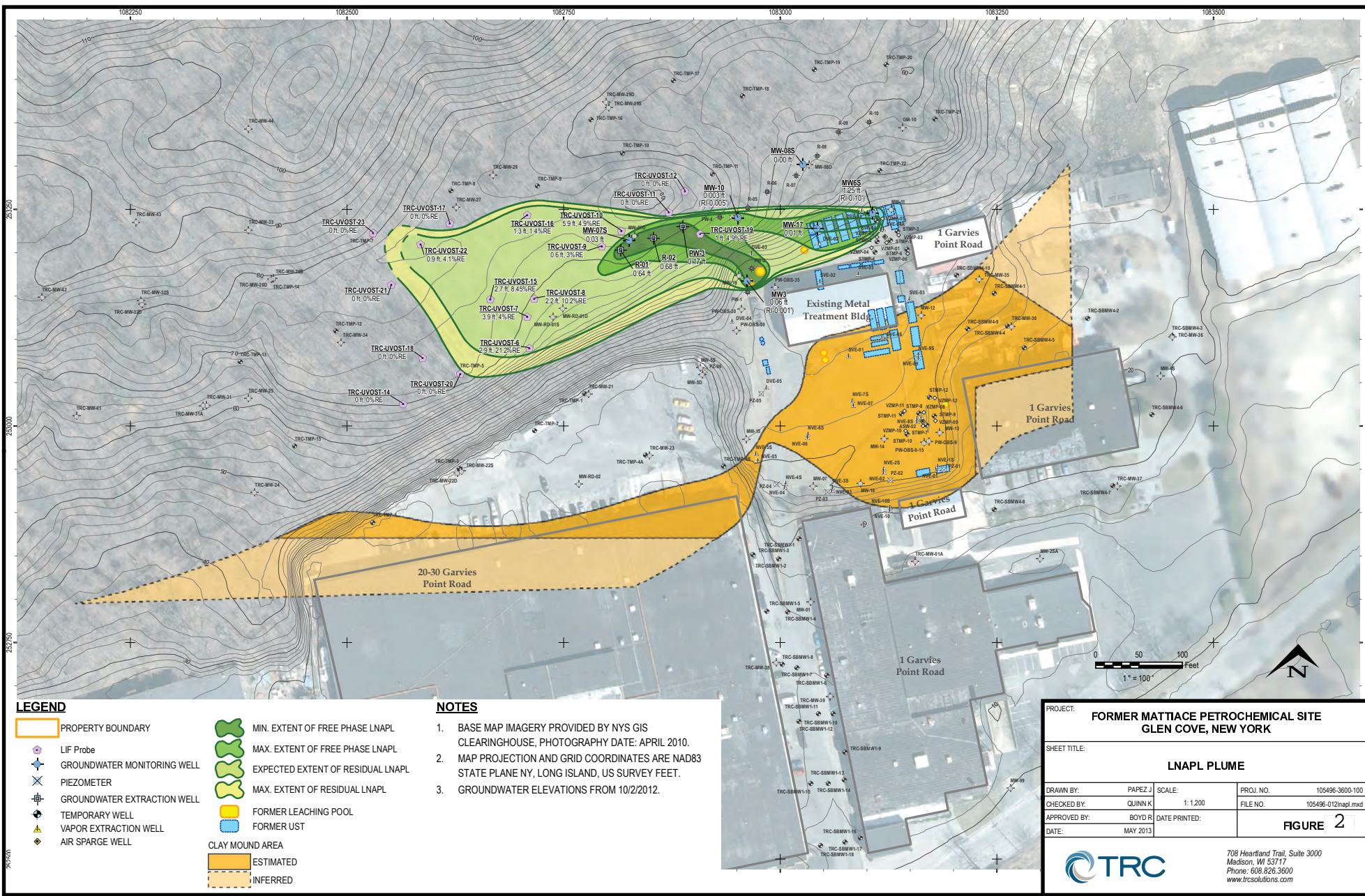
0 2,000 4,000
 FEET

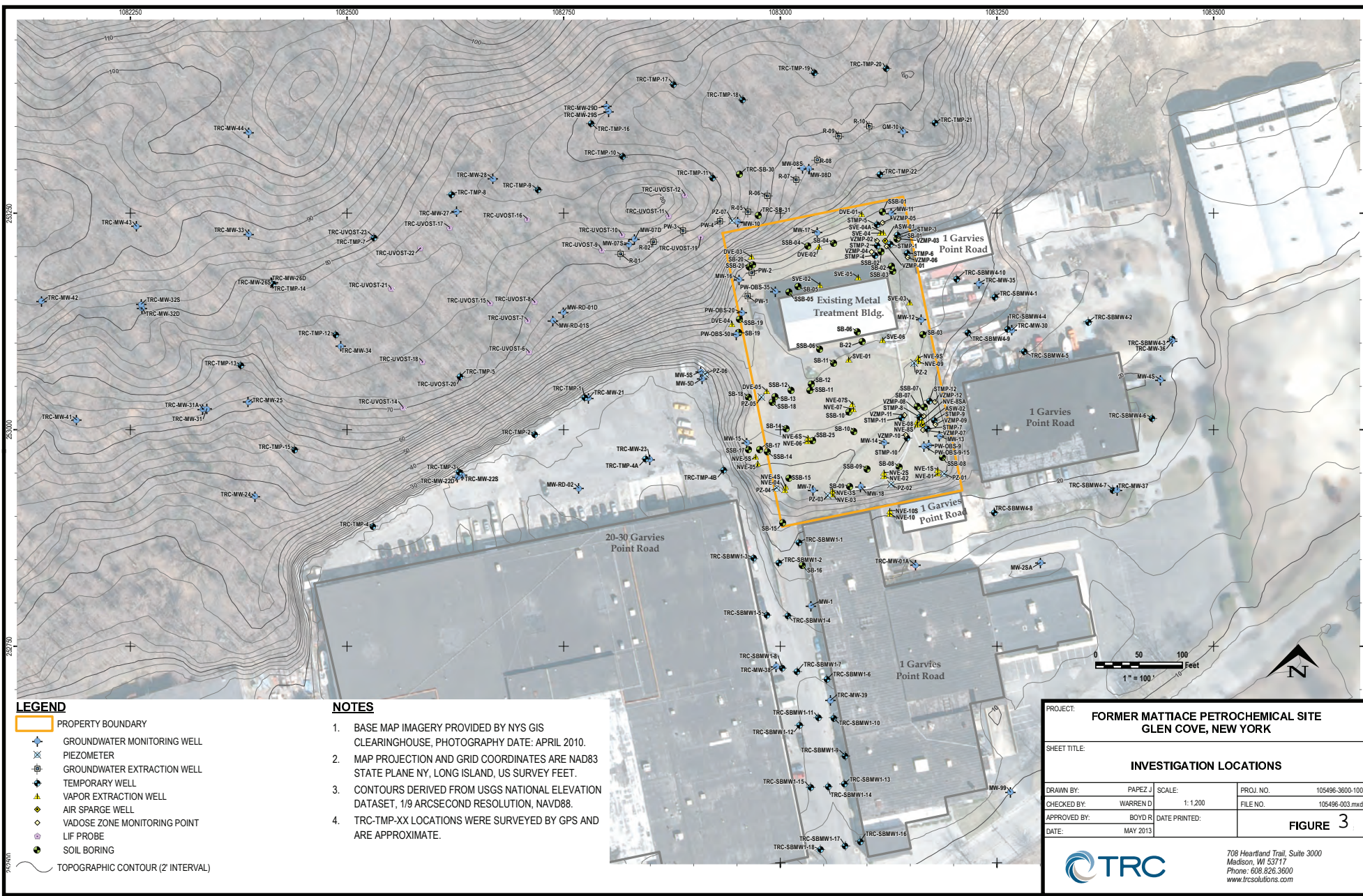


SITE LOCATION MAP

DRAWN BY:	PAPEZ J
APPROVED BY:	BOYD R
PROJECT NO:	105496-3600-100
FILE NO.	105496-001slm.mxd
DATE:	SEPTEMBER 2013

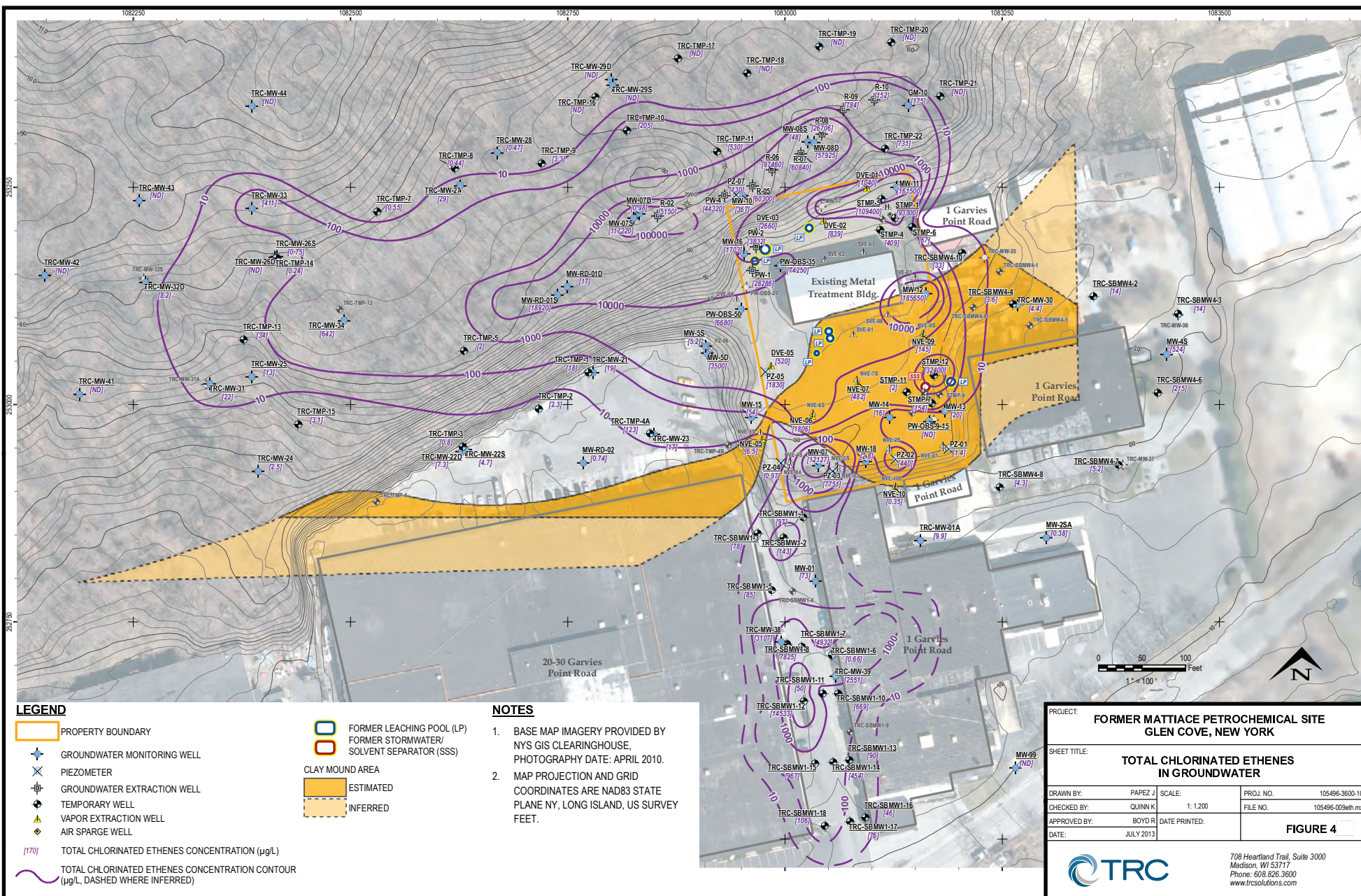
R2-0004887

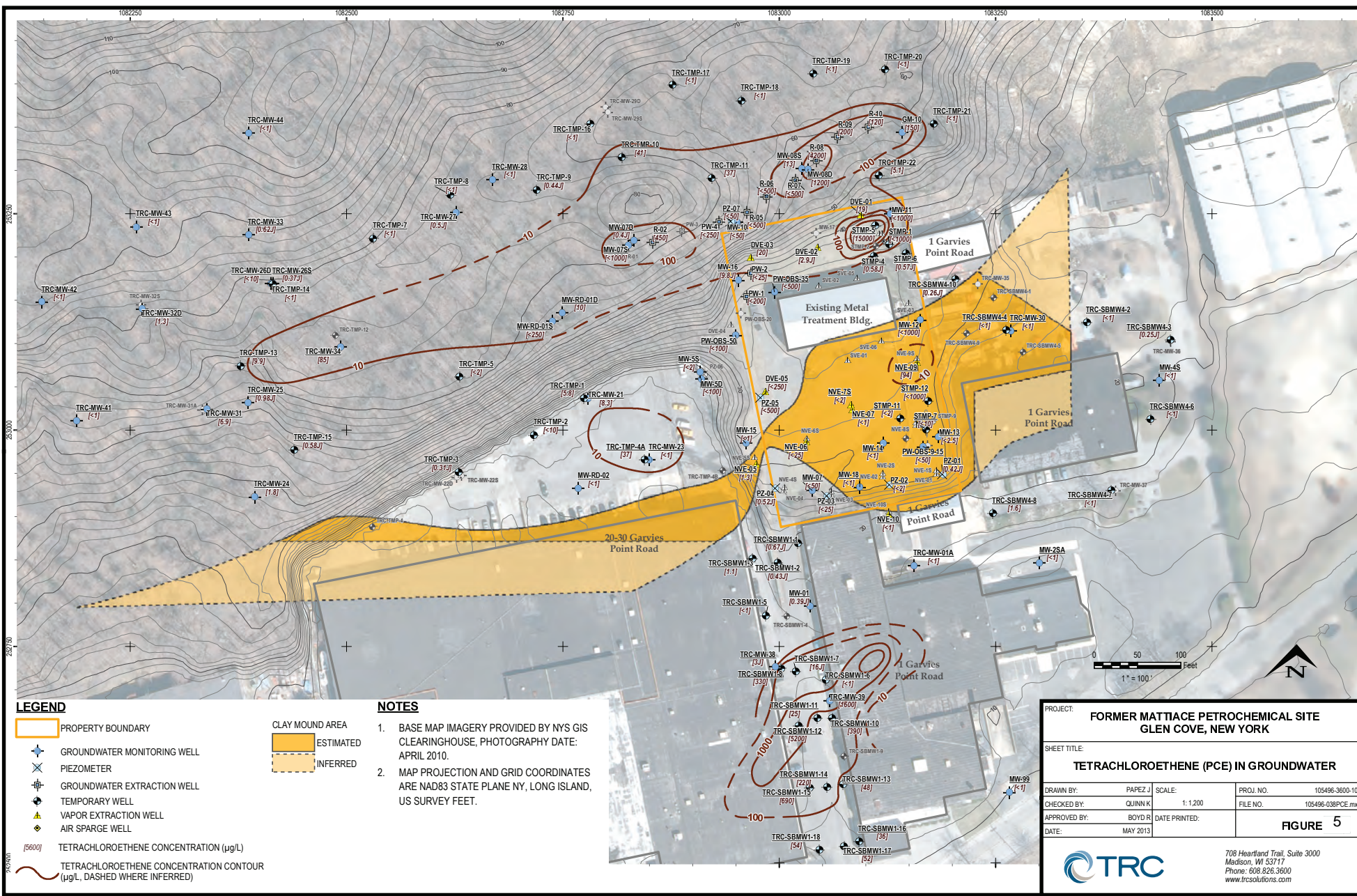


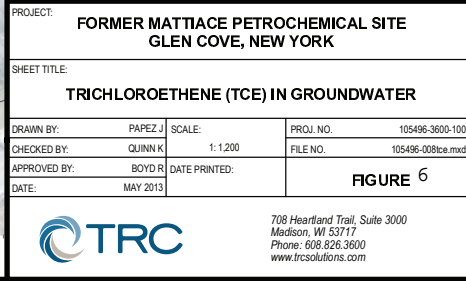


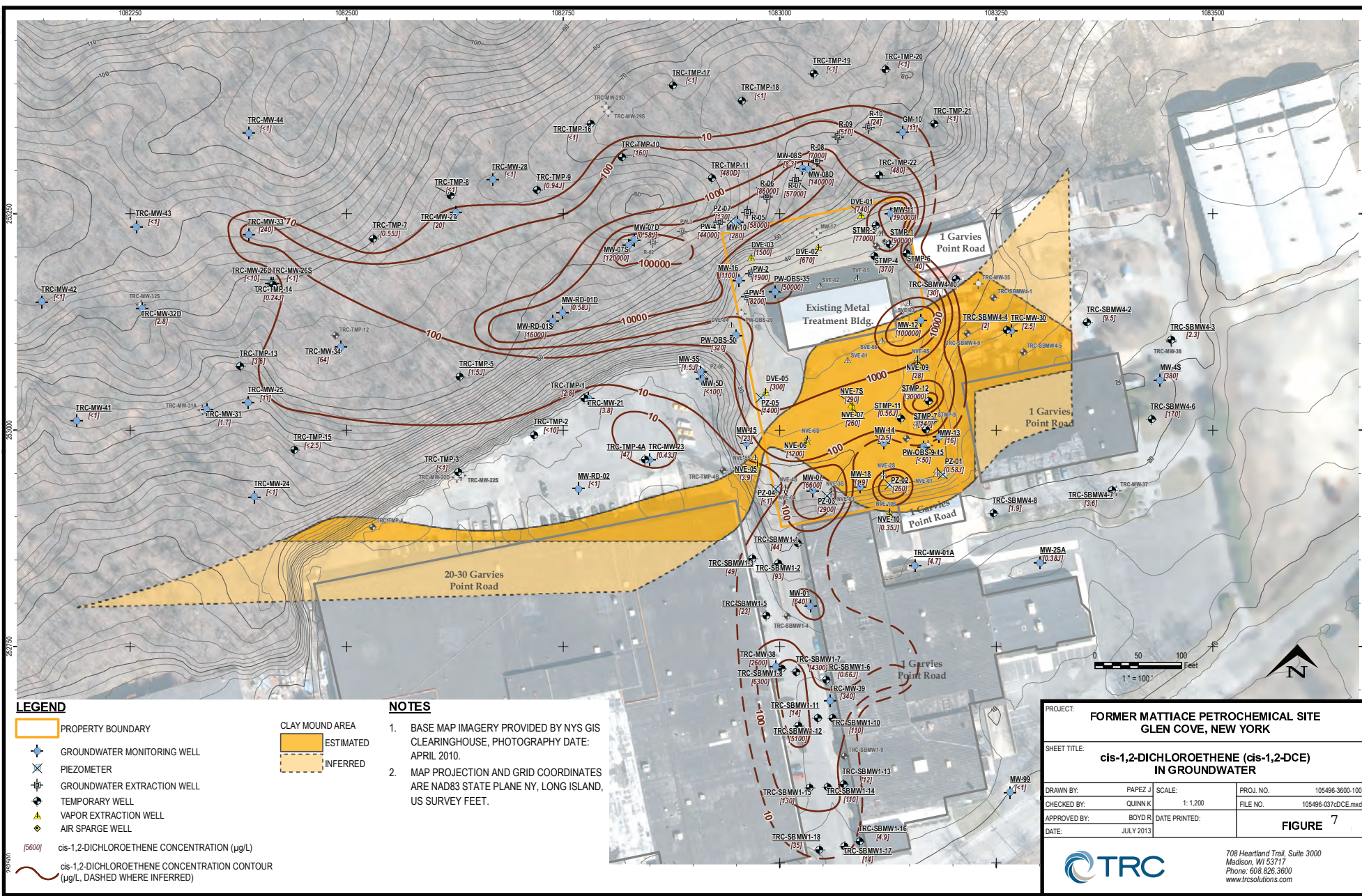
PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: INVESTIGATION LOCATIONS			
DRAWN BY: JPAPEZ J	SCALE: 1" = 100'	PROJ. NO. 105496-3600-100	FIGURE 3
CHECKED BY: WARREN D	DATE PRINTED: MAY 2013	FILE NO. 105496-003.mxd	
APPROVED BY: BOYD R			

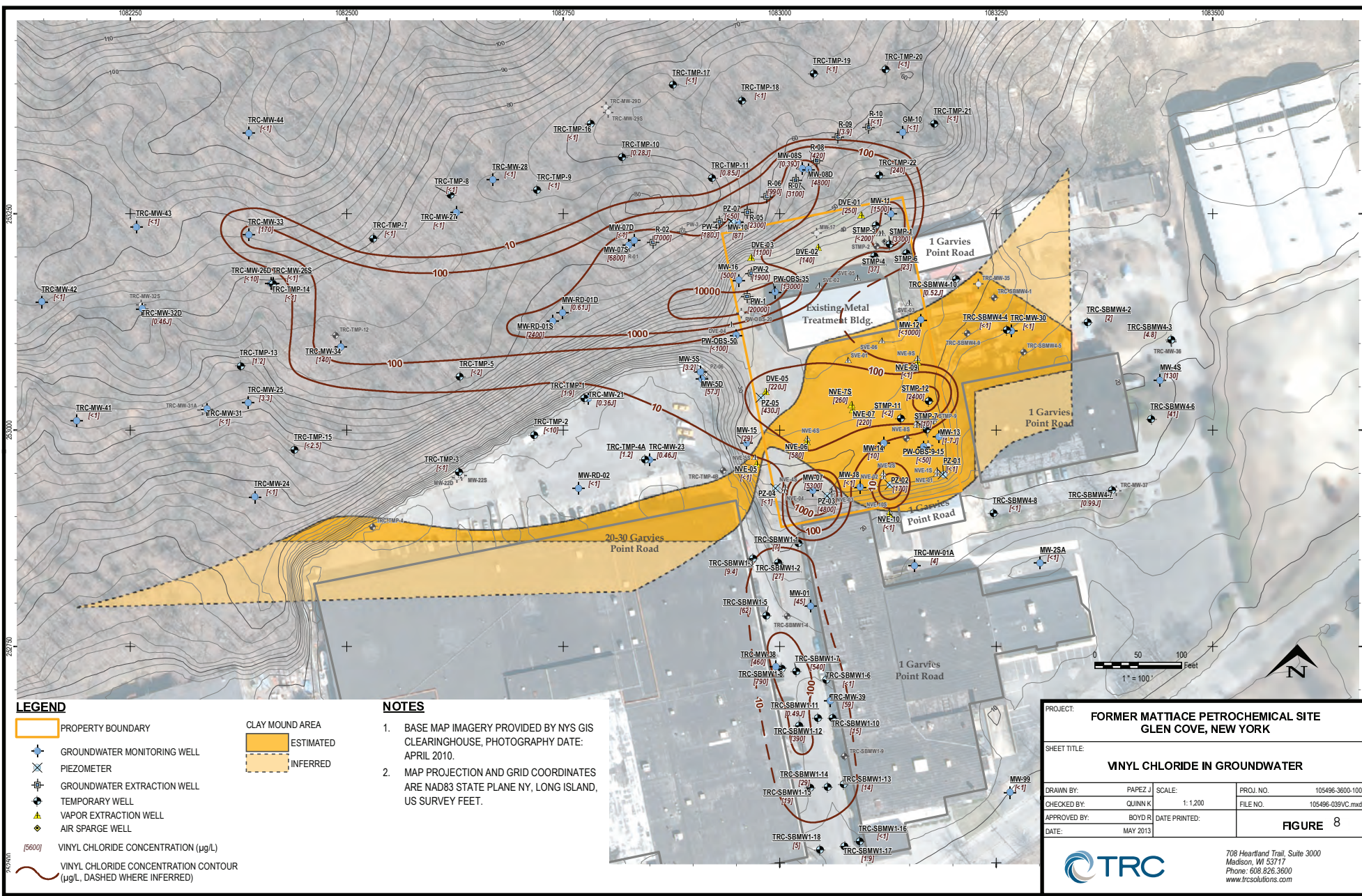
708 Heartland Trail, Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600
 www.trcsolutions.com

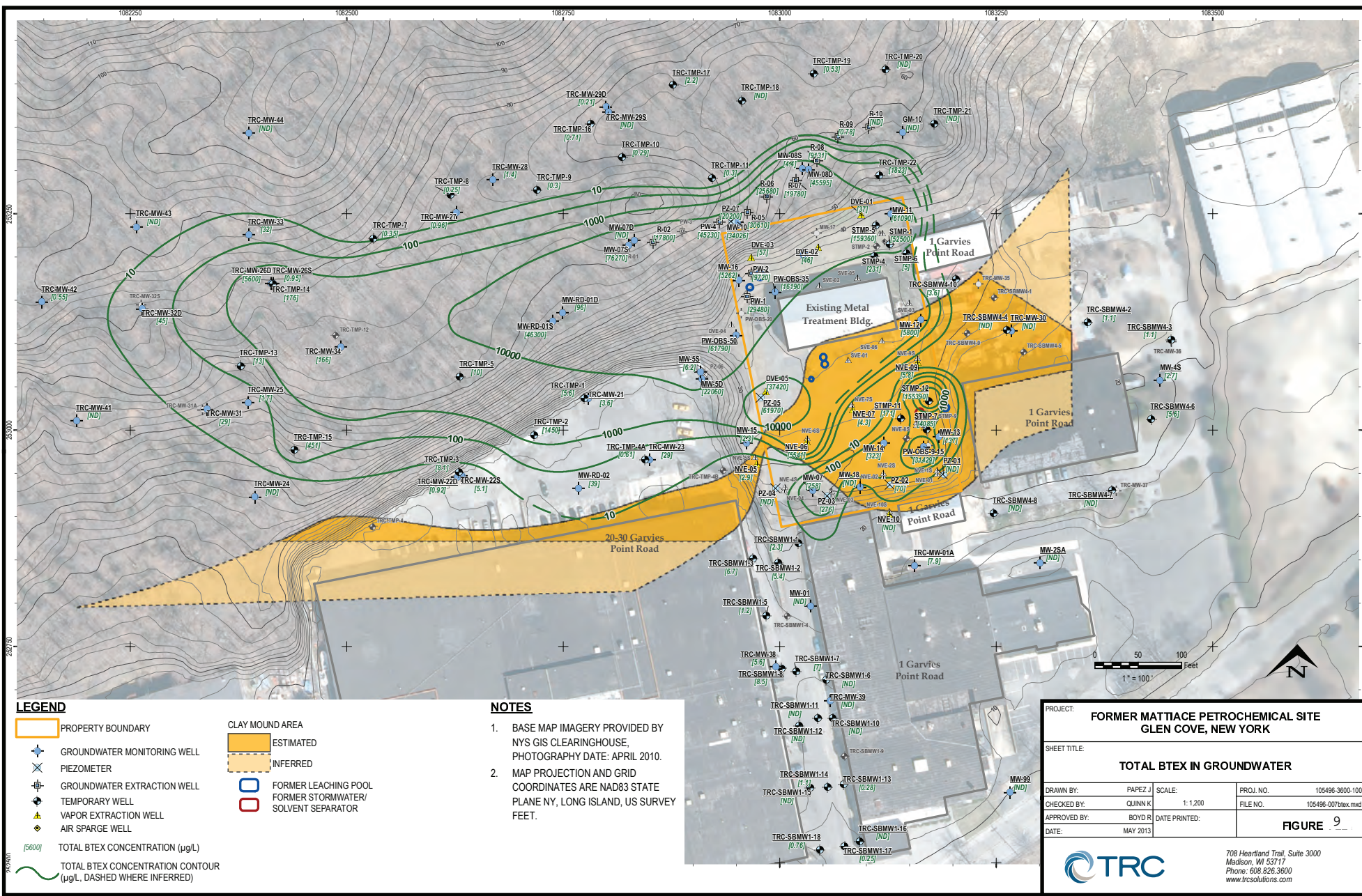


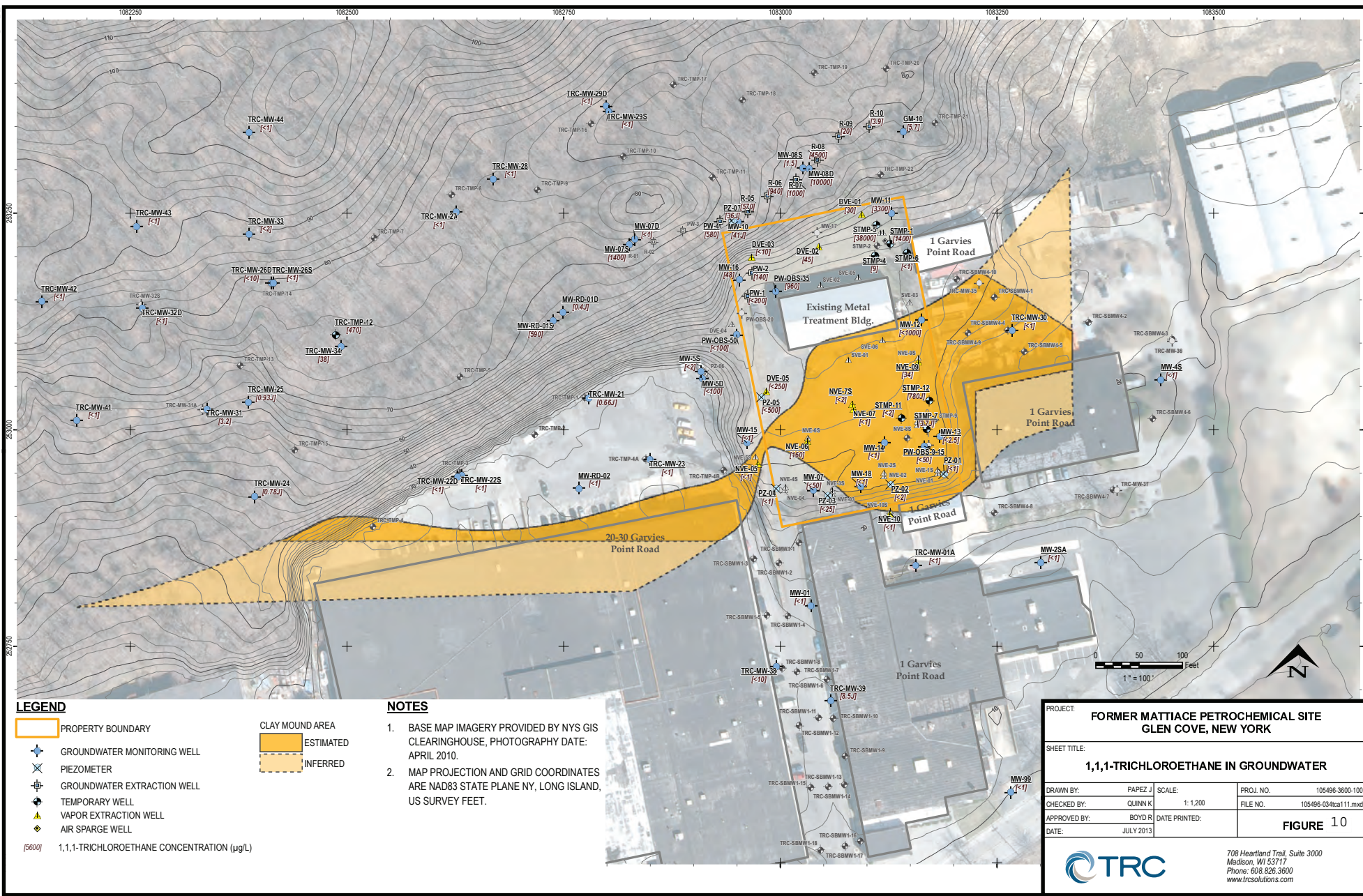












LEGEND

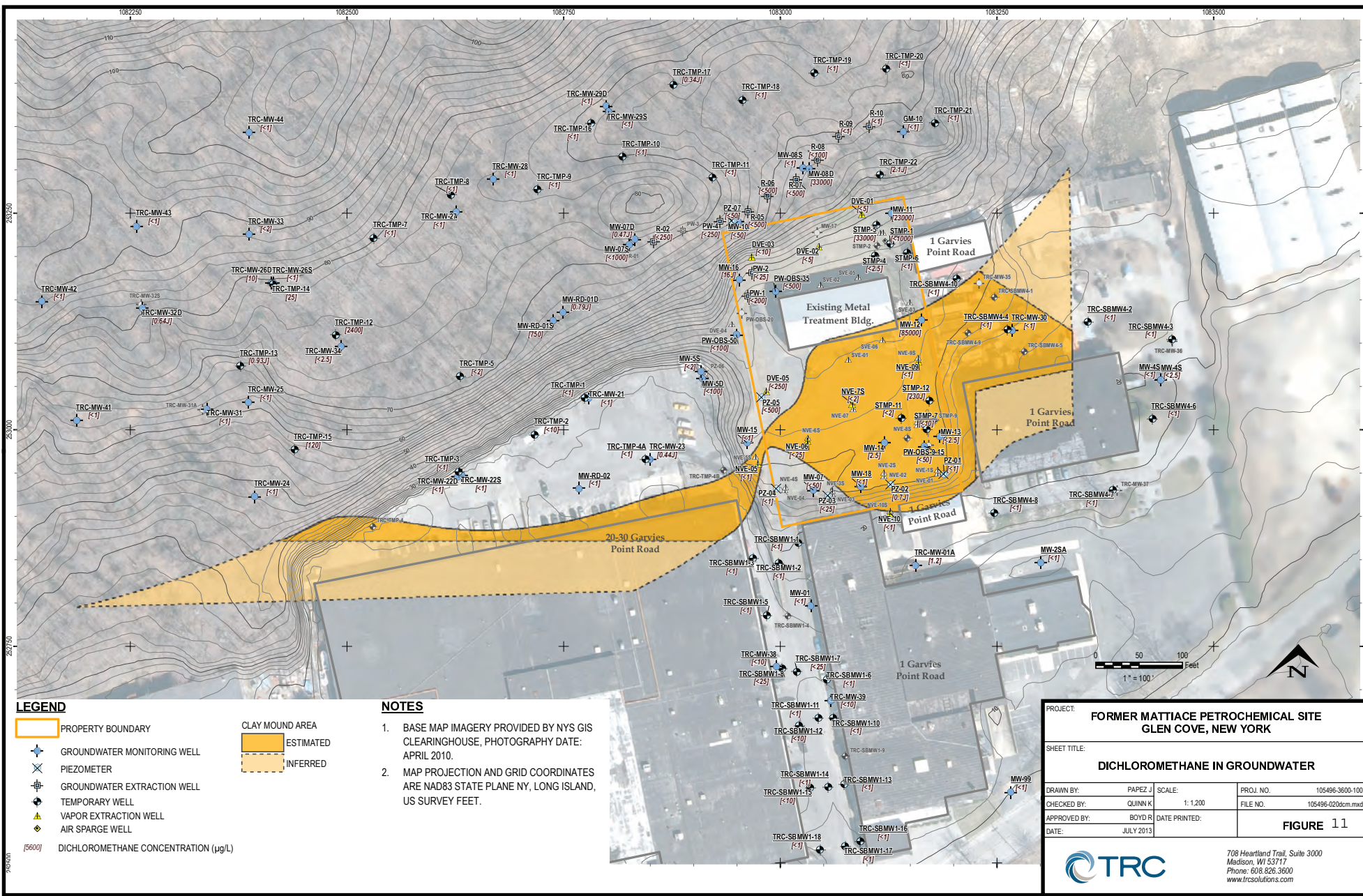
- PROPERTY BOUNDARY
- CLAY MOUND AREA
 - ESTIMATED
 - INFERRED
- GROUNDWATER MONITORING WELL
- PIEZOMETER
- GROUNDWATER EXTRACTION WELL
- TEMPORARY WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL


NOTES

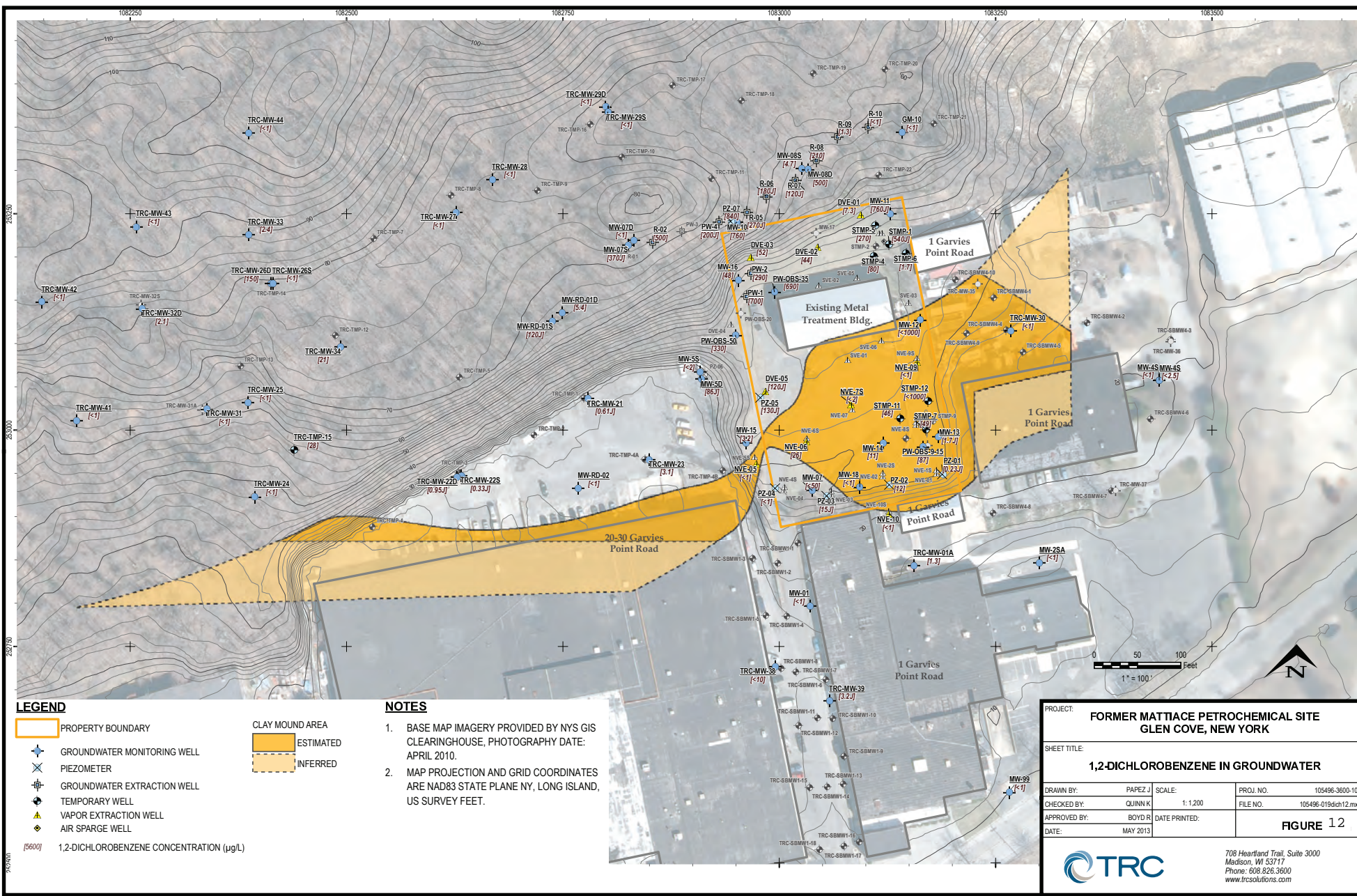
- BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
- MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.

PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: 1,1,1-TRICHLOROETHANE IN GROUNDWATER			
DRAWN BY: JPAPEZ	SCALE: 1" = 100'	PROJ. NO. 105496-3600-100	
CHECKED BY: QUINN K		FILE NO. 105496-034cat111.mxd	
APPROVED BY: BOYD R	DATE PRINTED:	FIGURE 10	
DATE: JULY 2013			

708 Heartland Trail, Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600
 www.trcsolutions.com



PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: DICHLOROMETHANE IN GROUNDWATER			
DRAWN BY: PAPEZ J		SCALE: 1" : 1200	PROJ. NO. 105496-3600-100
CHECKED BY: QUINN K			FILE NO. 105496-020dcm.mxd
APPROVED BY: BOYD R		DATE PRINTED:	FIGURE 11
DATE: JULY 2013			
		708 Heartland Trail, Suite 3000 Madison, WI 53717 Phone: 608.826.3600 www.trcsolutions.com	



LEGEND

- PROPERTY BOUNDARY
- CLAY MOUND AREA
 - ESTIMATED
 - INFERRED
- GROUNDWATER MONITORING WELL
- PIEZOMETER
- GROUNDWATER EXTRACTION WELL
- TEMPORARY WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- 1,2-DICHLOROBENZENE CONCENTRATION (µg/L)

NOTES

- BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
- MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.

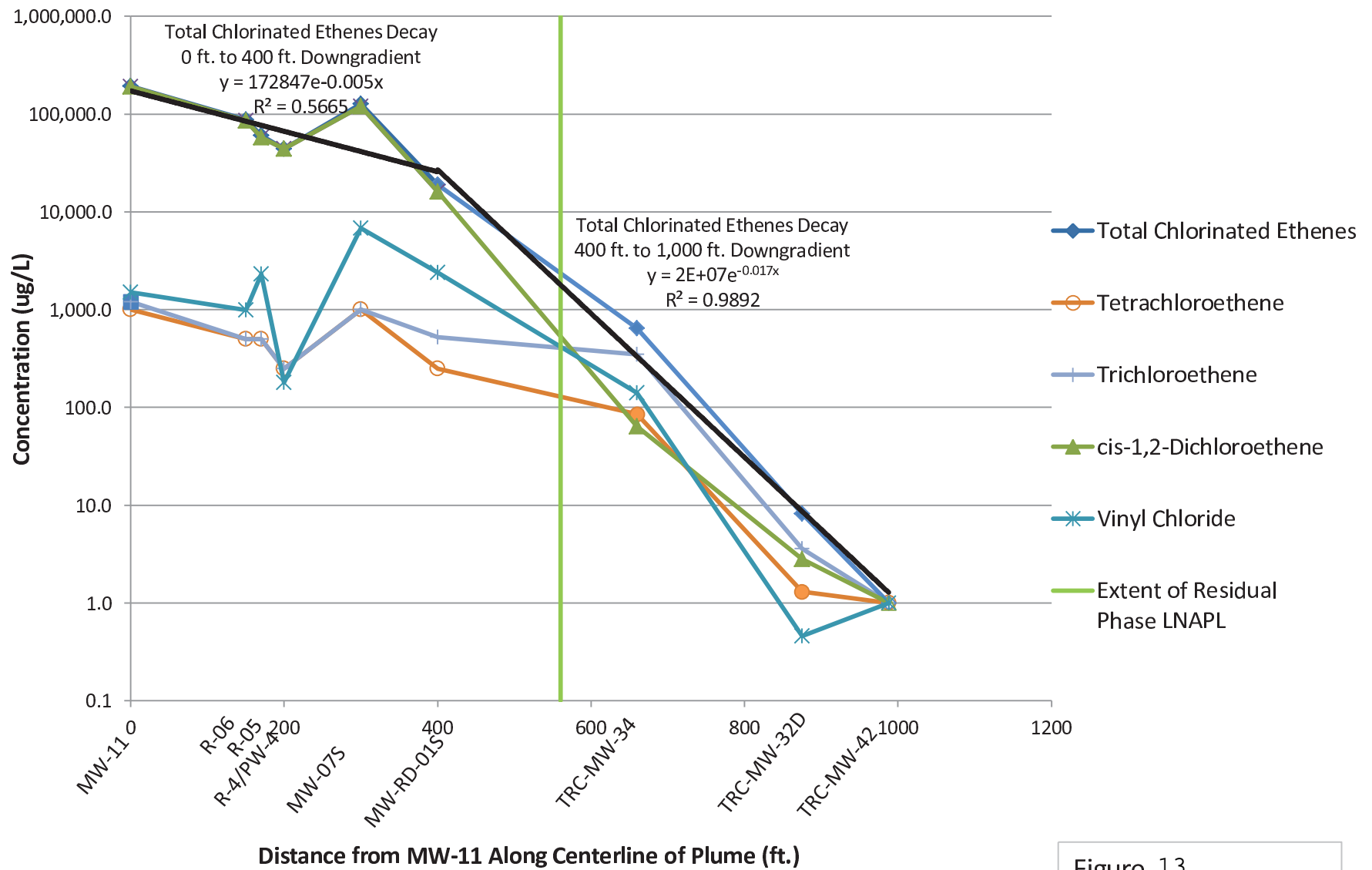
PROJECT:
 **FORMER MATTIACE PETROCHEMICAL SITE
GLEN COVE, NEW YORK**

SHEET TITLE:
 1,2-DICHLOROBENZENE IN GROUNDWATER

DRAWN BY:	PAPEZ J	SCALE:	1:1200	PROJ. NO.	105496-3600-100
CHECKED BY:	QUINN K	FILE NO.	105496-018dich12.mxd		
APPROVED BY:	BOYD R	DATE PRINTED:			
DATE:	MAY 2013	FIGURE 12			

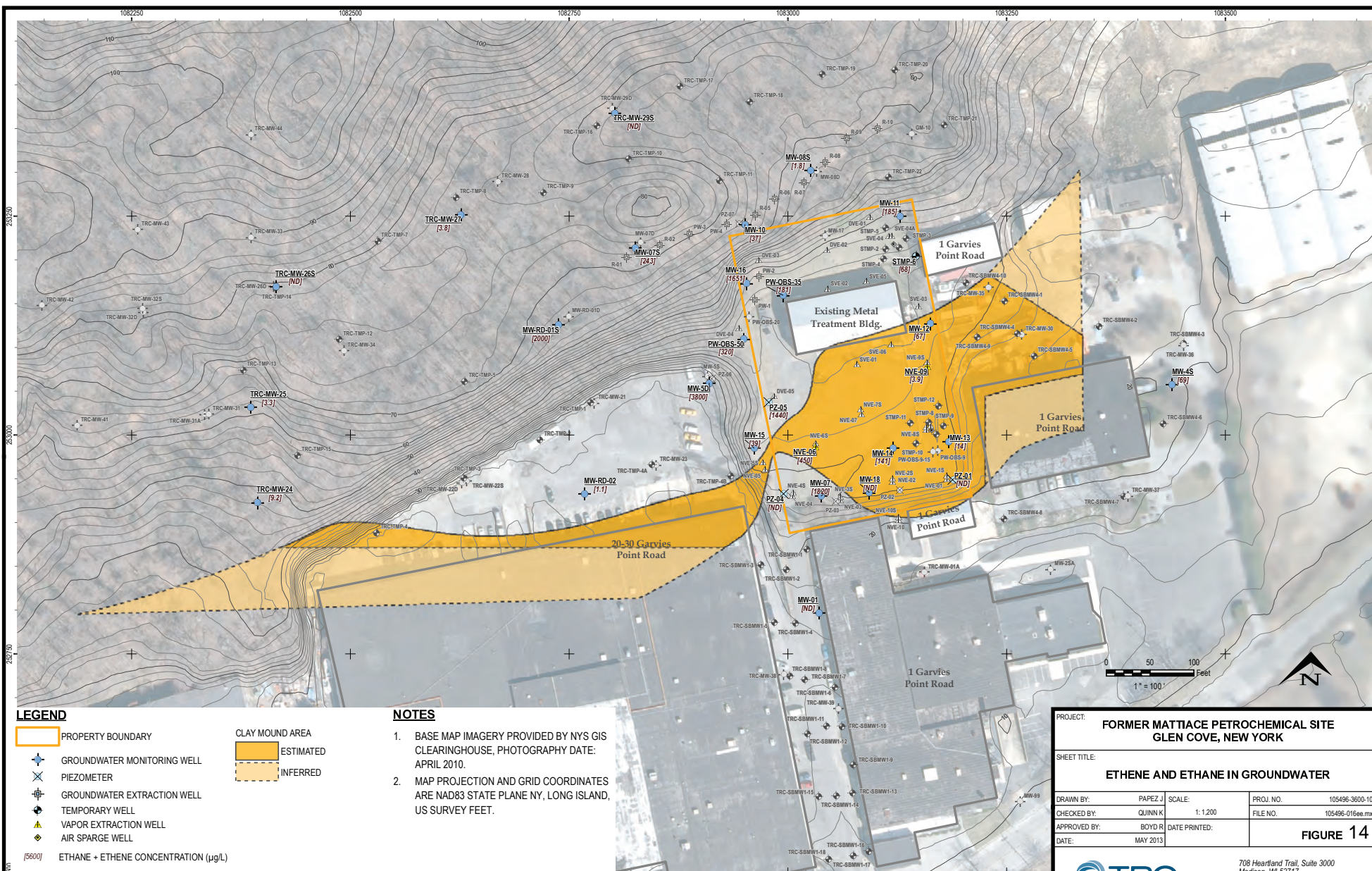
708 Heartland Trail, Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600
 www.trcsolutions.com

Chlorinated Ethenes Concentration Profile to West

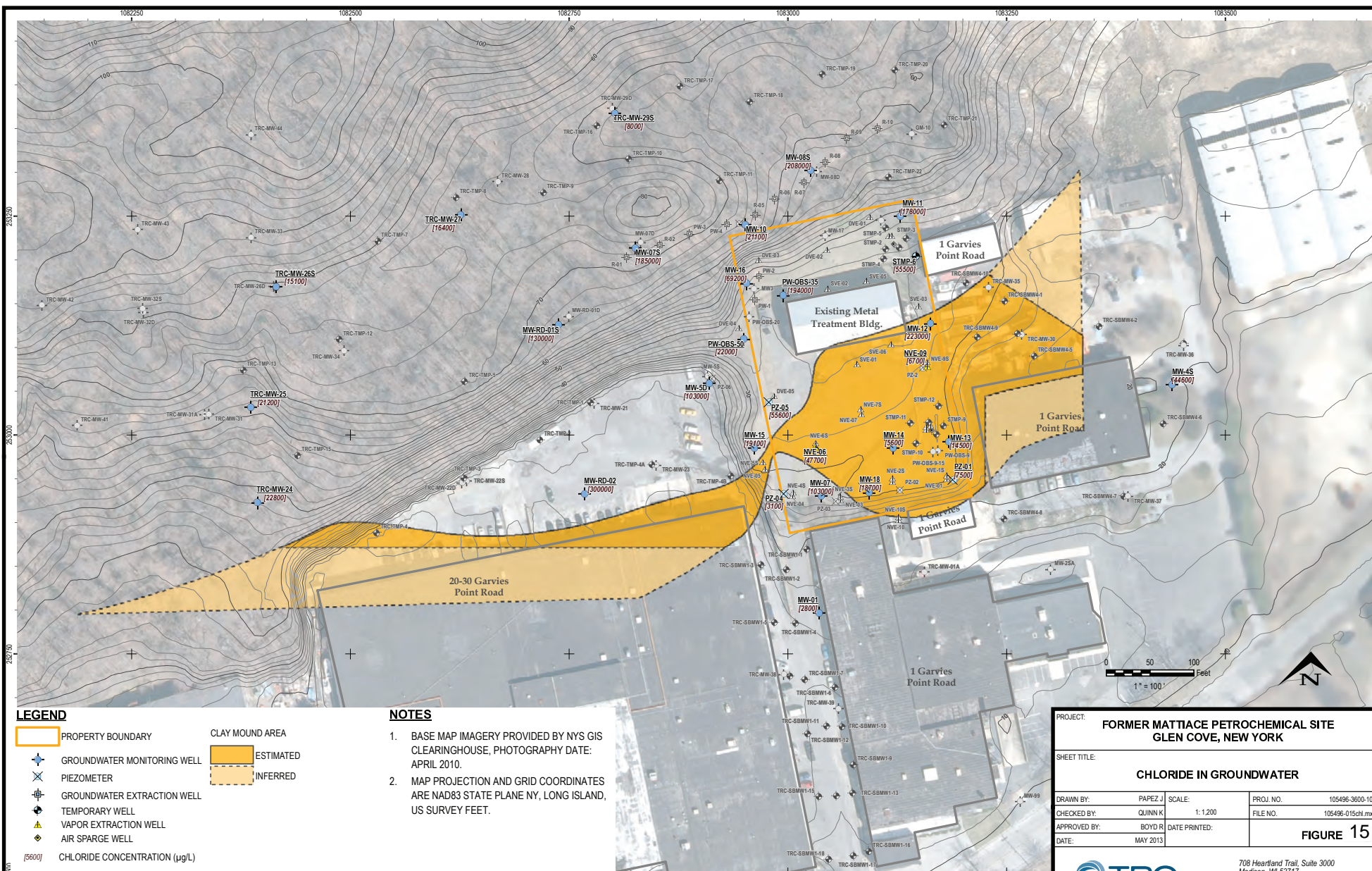


Non-detect values plotted with open symbol at detection limit.

Figure 13



PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: ETHENE AND ETHANE IN GROUNDWATER			
DRAWN BY: JPAPEZ	SCALE: 1:1200	PROJ. NO. 105496-3600-100	
CHECKED BY: QUINN K		FILE NO. 105496-016ee.mxd	
APPROVED BY: BOYD R	DATE PRINTED:	FIGURE 14	
DATE: MAY 2013			
		708 Heartland Trail, Suite 3000 Madison, WI 53717 Phone: 608.826.3600 www.trcsolutions.com	



LEGEND

	PROPERTY BOUNDARY		CLAY MOUND AREA
	GROUNDWATER MONITORING WELL		ESTIMATED
	PIEZOMETER		INFERRED
	GROUNDWATER EXTRACTION WELL		
	TEMPORARY WELL		
	VAPOR EXTRACTION WELL		
	AIR SPARGE WELL		
	CHLORIDE CONCENTRATION (µg/L)		

- NOTES**
1. BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
 2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.

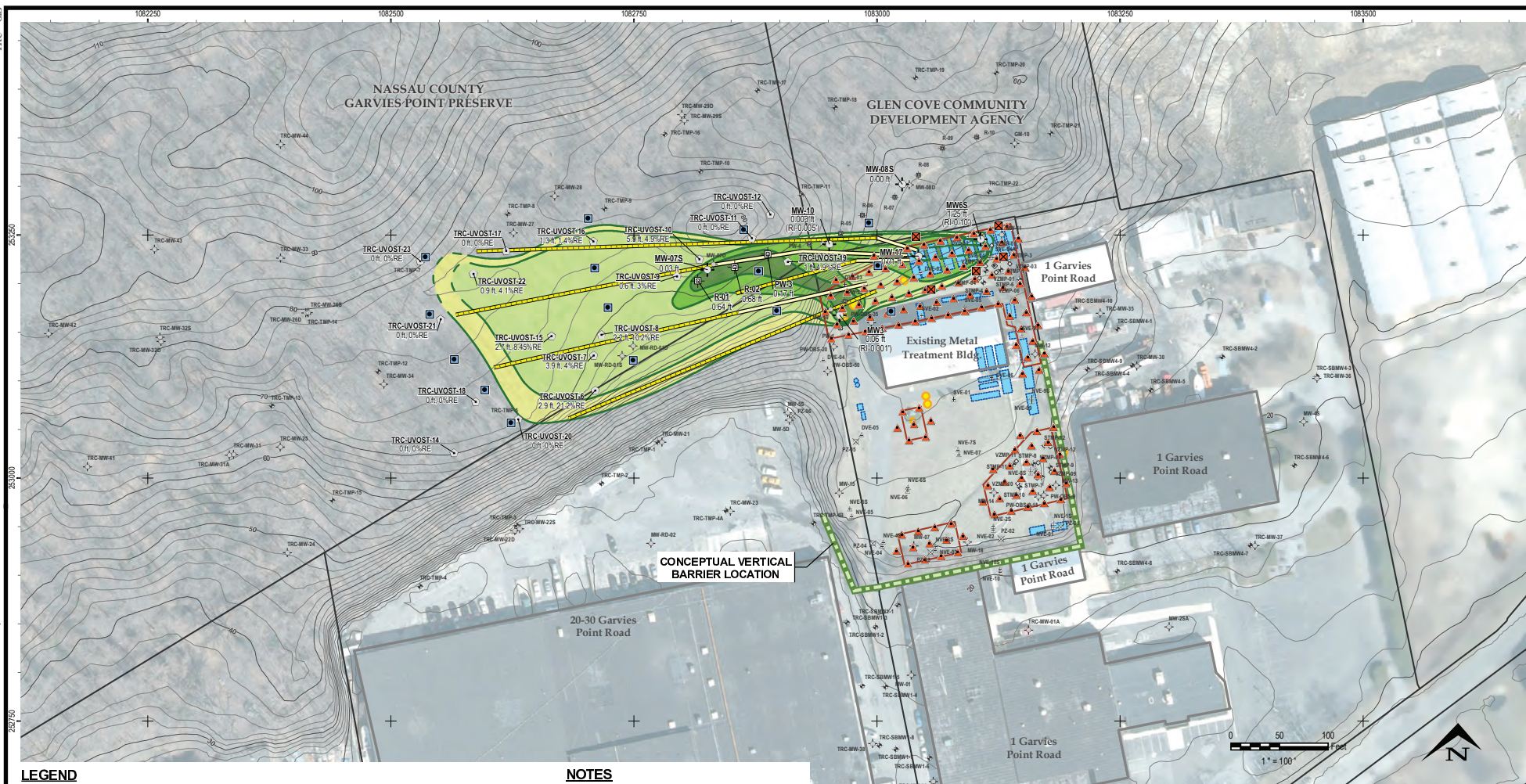
PROJECT: FORMER MATTIACE PETROCHEMICAL SITE
GLEN COVE, NEW YORK

SHEET TITLE: CHLORIDE IN GROUNDWATER

DRAWN BY: JPAPEZ	SCALE: 1:200	PROJ. NO. 105496-3600-100
CHECKED BY: QUINN K	DATE PRINTED: MAY 2013	FILE NO. 105496-015ch1.mxd
APPROVED BY: BOYD R		FIGURE 15

TRC

708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com



LEGEND

- LIF PROBE
- ⊕ GROUNDWATER MONITORING WELL
- ⊗ PIEZOMETER
- ⊕ GROUNDWATER EXTRACTION WELL
- ⊕ TEMPORARY WELL
- ⊕ VAPOR EXTRACTION WELL
- ⊕ AIR SPARGE WELL
- PROPOSED BIOVENTING LOCATIONS**
 - ⊕ VERTICAL BIOVENTING / INJECTION WELL
 - ⊕ VERTICAL BIOVENTING / EXTRACTION / INJECTION WELL
 - HORIZONTAL BIOVENTING WELL SCREEN
 - HORIZONTAL BIOVENTING WELL CASING

NOTES

- CONCEPTUAL VERTICAL BARRIER LOCATION
 - MIN. EXTENT OF FREE PHASE LNAPL
 - MAX. EXTENT OF FREE PHASE LNAPL
 - EXPECTED EXTENT OF RESIDUAL LNAPL
 - MAX. EXTENT OF RESIDUAL LNAPL
 - FORMER LEACHING POOL
 - FORMER UST
 - THERMAL TREATMENT AREA
 - PROPOSED ERH PROBE/SVE WELL
1. BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
 2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.
 3. GROUNDWATER ELEVATIONS FROM 10/2/2012.
 4. UPON COMPLETION OF THERMAL TREATMENT A PHYTOREMEDIATION SYSTEM, AS DESCRIBED ON FIGURE 4-11, WOULD BE IMPLEMENTED.

PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: CONCEPTUAL SITE PLAN FOR BIOVENTING, ENHANCED BIOREMEDIATION, THERMAL TREATMENT, PARTIAL CONTAINMENT, AND PHYTOREMEDIATION			
DRAWN BY: JPAPEZ J	SCALE: 1:1,200	PROJ. NO. 105496-3600-100	
CHECKED BY: WARREN D		FILE NO. 105496-055F.mxd	
APPROVED BY: BOYD R	DATE PRINTED:		
DATE: JANUARY 2014	FIGURE 16		

708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

TKC - GIS


Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet (Foot US)
Map Rotation: 0

Saved By: JPAPEZ on 3/28/2014, 13:57:56 PM
Path: E:\Mattiace\2013_105496\105496-134.mxd



- LEGEND**
- PROPERTY BOUNDARY
 - AREA OF MATTIACE SITE AS ADDRESSED BY SFS
 - TOPOGRAPHIC CONTOUR (2' INTERVAL)

- NOTES**
1. BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
 2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.
 3. CONTOURS DERIVED FROM USGS NATIONAL ELEVATION DATASET, 1/9 ARCSECOND RESOLUTION, NAVD88.
 4. ELEVATION OF LOWER CLAY UNIT IS ESTIMATED WITH RESPECT TO NAVD88.

PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK		
SHEET TITLE: MATTIACE SITE AS ADDRESSED BY SFS		
DRAWN BY: JPAPEZ J	SCALE: 1" = 100'	PROJ. NO. 105496-3600-100
CHECKED BY: WARREN D		FILE NO. 105496-134.mxd
APPROVED BY: BOYD R	DATE PRINTED:	FIGURE 17
DATE: MARCH 2014		
		708 Heartland Trail, Suite 3000 Madison, WI 53717 Phone: 608.826.3600 www.trcsolutions.com

APPENDIX II

Tables

Table 2
Record of Decision Human Health Risk Assessment Tables

ROD Human Health Risk Assessment Tables
TABLE 2.1 - Page 1.
CONCEPTUAL SITE MODEL
Former Mattiace Petrochemical Facility Glen Cove, New York

Scenario Timeframe	Media	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current / Future	Soil	Surface Soil	Surface Soil	On-Site Residential Worker	Adult	Ingestion	None	Excluded as an incomplete pathway. The June 1991 ROD for soil in OU-2 included excavation and removal of contaminated soils. Post remediation activities included addition of clean fill to excavated areas, regarding of site and addition of at least 6 inches of clean fill.
			Surface Soil	On-Site Residential Worker	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Residential Worker	Adult	Dermal Contact	None	
Current / Future	Soil	Surface Soil	Surface Soil	Trespasser	Adolescent	Ingestion	None	Excluded as an incomplete pathway. The June 1991 ROD for soil in OU-2 included excavation and removal of contaminated soils. Post remediation activities included addition of clean fill to excavated areas, regarding of site and addition of at least 6 inches of clean fill.
			Surface Soil	Trespasser	Adolescent	Inhalation of Fugitive Dust	None	
			Fugitive Dust	Trespasser	Adolescent	Dermal Contact	None	
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Preserve)	Adult	Ingestion	None	Excluded as an Incomplete Pathway. Garvies Point Museum and Preserve is part of the County's Department of Parks, Recreation and Museums whose mission is to preserve and interpret the county's natural prehistorical and historic heritage. The preserve is protected by the Parks Act which prohibits development in perpetuity. In addition, since no industrial activities have occurred on the Preserve property nor have Mattiace Property activities impacted the soils of the nature preserve, neither surface soil nor subsurface soils is considered an exposure point in the Preserve.
			Surface Soil	On-Site Resident (Preserve)	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Preserve)	Adult	Dermal Contact	None	
			Surface Soil	On-Site Resident (Preserve)	Child	Ingestion	None	
			Surface Soil	On-Site Resident (Preserve)	Child	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Preserve)	Child	Dermal Contact	None	
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Mattiace Site)	Adult	Ingestion	None	Excluded as an incomplete pathway. The June 1991 ROD for soil in OU-2 included excavation and removal of contaminated soils. Post remediation activities included addition of clean fill to excavated areas, regarding of site and addition of at least 6 inches of clean fill.
			Surface Soil	On-Site Resident (Mattiace Site)	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Adult	Dermal Contact	None	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Ingestion	None	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Child	Dermal Contact	None	
Future	Soil	Surface Soil	Surface Soil	Utilities Worker	Adult	Ingestion	None	Excluded as an incomplete pathway. The June 1991 ROD for soil in OU-2 included excavation and removal of contaminated soils. Post remediation activities included addition of clean fill to excavated areas, regarding of site and addition of at least 6 inches of clean fill.
			Surface Soil	Utilities Worker	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	Utilities Worker	Adult	Dermal Contact	None	
			Surface Soil	Construction Worker	Adult	Ingestion	None	
			Surface Soil	Construction Worker	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	Construction Worker	Adult	Dermal Contact	None	

ROD Human Health Risk Assessment Tables

TABLE 2.1 - Page 2.

CONCEPTUAL SITE MODEL

Former Mattiace Petrochemical Facility Glen Cove, New York

Scenario Timeframe	Media	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Preserve)	Adult	Ingestion	None	Excluded as an Incomplete Pathway. Garvies Point Museum and Preserve is part of the County's Department of Parks, Recreation and Museums whose mission is to preserve and interpret the county's natural prehistorical and historic heritage. The preserve is protected by the Parks Act which prohibits development in perpetuity. In addition, since no industrial activities have occurred on the Preserve property nor have Mattiace Property activities impacted the soils of the nature preserve, neither surface soil nor subsurface soils is considered an exposure point in the Preserve.
			Surface Soil	On-Site Resident (Preserve)	Adult	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Preserve)	Adult	Dermal Contact	None	
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Preserve)	Child	Ingestion	None	Excluded as an Incomplete Pathway. Garvies Point Museum and Preserve is part of the County's Department of Parks, Recreation and Museums whose mission is to preserve and interpret the county's natural prehistorical and historic heritage. The preserve is protected by the Parks Act which prohibits development in perpetuity. In addition, since no industrial activities have occurred on the Preserve property nor have Mattiace Property activities impacted the soils of the nature preserve, neither surface soil nor subsurface soils is considered an exposure point in the Preserve.
			Surface Soil	On-Site Resident (Preserve)	Child	Inhalation of Fugitive Dust	None	
			Fugitive Dust	On-Site Resident (Preserve)	Child	Dermal Contact	None	
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Mattiace Site)	Adult	Ingestion	Quantitative	Complete pathway. Subsurface soils brought to surface during development activities may result in potential exposure if not managed appropriately. Available for ingestion and dermal contact and inhalation of particulates during construction activities.
			Surface Soil	On-Site Resident (Mattiace Site)	Adult	Inhalation of Fugitive Dust	Quantitative	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Adult	Dermal Contact	Quantitative	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Ingestion	Quantitative	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Inhalation of Fugitive Dust	Quantitative	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Child	Dermal Contact	Quantitative	
Future	Soil	Surface Soil	Surface Soil	On-Site Resident (Mattiace Site)	Adult	Ingestion	Quantitative	Excluded as an incomplete pathway. The June 1991 ROD for soil in OU-2 included excavation and removal of contaminated soils. Post remediation activities included addition of clean fill to excavated areas, regarding of site and addition of at least 6 inches of clean fill.
			Surface Soil	On-Site Resident (Mattiace Site)	Adult	Inhalation of Fugitive Dust	Quantitative	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Adult	Dermal Contact	Quantitative	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Ingestion	Quantitative	
			Surface Soil	On-Site Resident (Mattiace Site)	Child	Inhalation of Fugitive Dust	Quantitative	
			Fugitive Dust	On-Site Resident (Mattiace Site)	Child	Dermal Contact	Quantitative	
Future	Soil	Surface Soil	Subsurface Soil	On Site Commercial/ Industrial Worker	Adult	Ingestion	Quantitative	Complete pathway. Subsurface soils brought to surface during development activities may result in potential exposure if not managed appropriately. Exposure pathways include ingestion and dermal contact and inhalation of particulates during construction activities.
			Subsurface Soil	On Site Commercial/ Industrial Worker	Adult	Dermal Contact	Quantitative	
			Fugitive Dust	On Site Commercial/ Industrial Worker	Adult	Inhalation of Fugitive Dust	Quantitative	
Future	Soil	Subsurface Soil	Volatiles from Soil	On Site Commercial/ Industrial Worker	Adult	Inhalation of Volatiles	Quantitative	Complete Exposure Pathway. Subsurface soils brought to the surface during development activities and not managed properly may result in exposure to the soils. Routes of exposure may include ingestion and dermal contact and inhalation of particulates during construction activities.
			Subsurface Soil	Utilities Worker	Adult	Ingestion	Quantitative	
			Subsurface Soil	Utilities Worker	Adult	Dermal Contact	Quantitative	
			Fugitive Dust	Utilities Worker	Adult	Inhalation of Fugitive Dust	Quantitative	
			Volatiles from Soil	Utilities Worker	Adult	Inhalation of Volatiles	Quantitative	
			Subsurface Soil	Construction Worker	Adult	Ingestion	Quantitative	
Future	Soil	Subsurface Soil	Subsurface Soil	Construction Worker	Adult	Dermal Contact	Quantitative	Complete Exposure Pathway. Subsurface soils brought to the surface during development activities and not managed properly may result in exposure to the soils. Routes of exposure may include ingestion and dermal contact and inhalation of particulates during construction activities.
			Subsurface Soil	Construction Worker	Adult	Inhalation of Fugitive Dust	Quantitative	
			Fugitive Dust	Construction Worker	Adult	Inhalation of Fugitive Dust	Quantitative	
Future	Soil	Subsurface Soil	Volatiles from Soil	Construction Worker	Adult	Inhalation of Volatiles	Quantitative	Complete Exposure Pathway. Subsurface soils brought to the surface during development activities and not managed properly may result in exposure to the soils. Routes of exposure may include ingestion and dermal contact and inhalation of particulates during construction activities.
			Subsurface Soil	Construction Worker	Adult	Ingestion	Quantitative	
			Subsurface Soil	Construction Worker	Adult	Dermal Contact	Quantitative	
Current	Soil Gas	Indoor Air	Indoor Air	On-Site remedial Contractor	Adult	Inhalation	None	Excluded. Current worker exposures governed by OSHA
Future	Soil Gas	Indoor Air	Indoor Air	On-Site Resident (Mattiace Site)	Adult	Inhalation	Quantitative	Complete Pathway. Sufficient soil gas and groundwater data to evaluate vapor intrusion
Future	Soil Gas	Indoor Air	Indoor Air	On-Site Resident (Mattiace Site)	Child	Inhalation	Quantitative	Complete Pathway. Sufficient soil gas and groundwater data to evaluate vapor intrusion
Future	Soil Gas	Indoor Air	Indoor Air	On-Site commercial/ Industrial Worker	Adult	Inhalation	Quantitative	Complete Pathway. Sufficient soil gas and groundwater data to evaluate vapor intrusion
Current	Groundwater	Indoor Air	Indoor Air	Off-Site Commercial/ Industrial Worker	Adult	Inhalation	Quantitative	Complete Pathway. Sufficient soil gas and groundwater data to evaluate vapor intrusion
Future	Groundwater	Indoor Air	Indoor Air	On-Site Resident (Preserve)	Adult	Inhalation	None	Excluded as an Incomplete Pathway. Garvies Point Museum and Preserve is part of the County's Department of Parks, Recreation and Museums whose mission is to preserve and interpret the county's natural prehistorically and historic heritage. The preserve is protected by the Parks Act which prohibits development in perpetuity. In addition, since no industrial activities have occurred on the Preserve property nor have Mattiace Property activities impacted the soils of the nature preserve, neither surface soil nor subsurface soils is considered an exposure point in the Preserve.
				On-site Resident (Preserve)	Child	Inhalation	None	

ROD Human Health Risk Assessment Tables
TABLE 2.1 - Page 3
CONCEPTUAL SITE MODEL
Former Mattiace Petrochemical Facility Glen Cove, New York

Scenario Timeframe	Media	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Water at Tap	On-Site Remedial Contractor	Adult	Ingestion	None	Incomplete Pathway. Groundwater is not in use as a potable water source at the site. Additionally, any contact with groundwater would entail Person Protective Equipment consistent with OSHA.
			Water at Tap	On-Site Remedial Contractor	Adult	Dermal While Washing	None	
Current	Groundwater	Groundwater	Water at Tap	Off-Site Commercial/Industrial Worker	Adult	Ingestion	None	Incomplete Pathway. Groundwater is not in use as a potable source under current conditions.
			Water at Tap	Off-Site Commercial/Industrial Worker	Adult	Dermal While Washing	None	
Future	Groundwater	Groundwater	Water at Tap	On-Site commercial/Industrial Worker	Adult	Ingestion	Quantitative	Complete pathway. Potential future use of potable water source includes ingestion and dermal contact.
			Water at Tap	On-Site commercial/Industrial Worker	Adult	Dermal While Showering	Quantitative	
			Water at Tap	On-Site commercial/Industrial Worker	Adult	Inhalation of Volatile Organic Compounds While Showering	Quantitative	
Future	Groundwater	Groundwater	Water at Tap	On-Site Resident (Preserve)	Adult	Ingestion	Quantitative	Excluded as an Incomplete Pathway. Garvies Point Museum and Preserve is part of the County's Department of Parks. Recreation and Museums whose mission is to preserve and interpret the county's natural prehistoric and historic heritage. The preserve is protected by the Parks Act which prohibits development in perpetuity. In addition, since no industrial activities have occurred on the Preserve property nor have Mattiace Property activities impacted the soils of the nature preserve, neither surface soil nor subsurface soils is considered an exposure point in the Preserve.
			Water at Tap	On-Site Resident (Preserve)	Adult	Dermal While Showering	Quantitative	
Future	Groundwater	Groundwater	Water at Tap	On-Site Resident (Preserve)	Child	Ingestion	Quantitative	
			Water at Tap	On-Site Resident (Preserve)	Child	Dermal While Showering	Quantitative	
Future	Groundwater	Groundwater	Water at Tap	On-Site Resident (Mattiace Site)	Adult	Ingestion	Quantitative	Complete Exposure Pathway. Potential for future use of potable water source including ingestion and dermal contact of groundwater. Potential exists for inhalation of volatile organic compounds during showering.
			Water at Tap	On-Site Resident (Mattiace Site)	Adult	Dermal While Showering	Quantitative	
			Water at Tap	On-Site Resident (Mattiace Site)	Adult	Inhalation of Volatile Organic Compounds While Showering	Quantitative	
Future	Groundwater	Groundwater	Water at Tap	On-Site Resident (Mattiace Site)	Child	Ingestion	Quantitative	
			Water at Tap	On-Site Resident (Mattiace Site)	Child	Dermal While Bathing	Quantitative	
			Water at Tap	On-Site Resident (Mattiace Site)	Child	Inhalation of Volatile Organic Compounds While Showering	Quantitative	
Current / Future	Groundwater	Groundwater	Groundwater	Utilities Worker	Adult	Incidental Ingestion	None	Excluded since it is an insignificant pathway.
			Groundwater	Utilities Worker	Adult	Dermal Contact	Quantitative	
			Groundwater	Utilities Worker	Adult	Inhalation of Fugitive Dust	Quantitative	
Future	Groundwater	Groundwater	Groundwater	Construction Worker	Adult	Incidental Ingestion	None	Excluded since it is an insignificant pathway.
			Groundwater	Construction Worker	Adult	Dermal Contact	Quantitative	
			Groundwater	Construction Worker	Adult	Inhalation	Quantitative	
Current / Future	Surface Water	Surface Water	Surface Water	Trespasser	Adolescent	Incidental Ingestion	None	Incomplete Pathway. Current site data indicates migration of site contaminants to the creek is not a completed pathway.
			Surface Water	Trespasser	Adolescent	Dermal	None	
Current / Future	Sediment	Sediment	Sediment	Trespasser	Adolescent	Incidental Ingestion	None	Incomplete Pathway. Current site data indicates migration of site contaminants to the creek is not a completed pathway.
			Sediment	Trespasser	Adolescent	Dermal	None	

ROD Human Health Risk Assessment Tables
Table 2.2. Page 1
Exposure Point Concentrations for Chemicals of Concern
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Groundwater
Exposure Medium:	Groundwater

Exposure Point (1)	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual			
		Minimum	Maximum	Units (1)		Value	Units (1)	Statistic (1)	Rationale (2)
On-Site Shallow Groundwater < 15 bgs	Ethyl benzene	0.24	32,000	ug/l	122/141	3800	ug/l	97.5%KM (Chebyshev) UCL	ProUCL
	Tetrachloroethene	0.27	52000	ug/l	67/141	3100	ug/l	97.5%KM (Chebyshev) UCL	ProUCL
	Toluene	0.21	150000	ug/l	90/102	32000	ug/l	97.5%KM (Chebyshev) UCL	ProUCL
	Trichloroethylene	0.46	26000	ug/l	94/141	3300	ug/l	97.5%KM (Chebyshev) UCL	ProUCL
	Vinyl Chloride	0.29	20000	ug/l	103/131	2,700	ug/l	95%KM (Chebyshev) UCL	ProUCL
	Bis(2-ethylhexyl)Phthalate	3.7	53	ug/l	2/13	53	ug/l	Maximum Concentration	Insufficient detects to calculate an Upper Confidence Limit. The maximum concentration was used as the EPC.
	cis-1,2-Dichloroethene	0.47	190000	ug/l	100/102	37000	ug/l	95%KM (Chebyshev) UCL	

(1) Definitions - bgs = below ground surface; ug/l = micrograms/liter; UCL = Upper Confidence Limit on the Mean; KM = Kaplan Meier.

(2) ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
Table 2.2. Page 2.
Exposure Point Concentrations for Chemicals of Concern
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Groundwater
Exposure Medium:	Groundwater

Exposure Point	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual (1)			
		Minimum	Maximum	Units (1)		Value	Units (1)	Statistic (1)	Rationale (1)
Tap Water	1,1-Dichloroethane	0.285	8600	ug/l	18/147	1200	ug/l	97.5% KM (Chebyshev) UCL	ProUCL
	1,2-dichloroethane	0.32	1200	ug/l	57/147	69	ug/l	95% KM using Student t-distribution UCL	ProUCI
	1,4-Dichlorobenzene	0.48	180	ug/l	31/147	16	ug/l	95% KM using Student t-distribution UCL	ProUCI
	Benzene	0.22	3700	ug/l	92/147	380	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Chloroform	0.64	3500	ug/l	46/147	140	ug/l	95% KM using Student t-distribution UCL	ProUCI
	Dichloromethane	0.61	110000	ug/l	52/194	9100	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Ethyl benzene	0.24	32000	ug/l	159/194	3100	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Tetrachloroethene	0.22	52000	ug/l	78/194	2200	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Toluene	0.21	150000	ug/l	128/147	27000	ug/l	95% KM (Chebyshev) UCL	ProUCI
	Trichloroethylene	0.27	140000	ug/l	122/194	10000	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Vinyl Chloride	0.29	20000	ug/l	137/182	2300	ug/l	95% KM (Chebyshev) UCL	ProUCI
	cis-1,2-dichloroethene	0.3	190000	ug/l	137/147	29000	ug/l	95% KM (Chebyshev) UCL	ProUCI
	Xylene (total)	0.2	220000	ug/l	160/194	16000	ug/l	97.5% KM (Chebyshev) UCL	ProUCI
	Bis(2-ethylhexyl)Phthalate	1.3	53	ug/l	7/23	11	ug/l	95% KM based on Kaplan-Meier estimates using the bias corrected accelerated bootstrap method	ProUCI
	4,4'-DDD	0.11	0.11	ug/l	1/8	0.11	ug/l	Maximum Concentration - insufficient detects in calculated UCL	ProUCI
	Arsenic	12.4	19	ug/l	4/23	19	ug/l	Maximum Concentration - insufficient detects in calculated UCL	ProUCI
	Cadmium	24.1	81.3	ug/l	2/23	81.3	ug/l	Maximum Concentration - insufficient detects in	ProUCI
	Cobalt	51.1	289	ug/l	5/23	83	ug/l	95% KM using Student t-distribution UCL	ProUCI
	Iron	597	129000	ug/l	22/23	61000	ug/l	95% KM (Chebyshev) UCL	ProUCI
	Manganese	232	21600	ug/l	22/23	7700	ug/l	95% KM (Chebyshev) UCL	ProUCI

(1) Definitions: RME - Reasonable Maximum Exposure; CTE - Central Tendency Exposure; ug/l = micrograms/liter; K-M = Kaplan Meier. UCL = Upper Confidence Limit on the Mean.

(2) ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
 Table 2. 2. Page 3.
 Exposure Point Concentrations for Chemicals of Concern
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Subsurface Soil
Exposure Medium:	Subsurface Soil

Exposure Point	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual (1)			
		Minimum	Maximum	Units (1)		Value	Units (1)	Statistic (1)	Rationale (2)
Subsurface Soil	Trichloroethylene	0.00087	56	mg/kg	69/104	6	mg/kg	97.5% KM (Chebyshev)UCL	ProUCL*
	Tetrachloroethylene	0.00052	29	mg/kg	64/99	3.3	mg/kg	97.5% KM (Chebyshev)UCL	ProUCL
	Xylenes (total)	0.001	100	mg/kg	58/90	15	mg/kg	97.5% KM (Chebyshev)UCL	ProUCL

(1) Definitions: RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure; mg/kg = milligrams/kilogram; K-M = Kaplan Meier. UCL = Upper Confidence Limit on the Mean.

(2) ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
 Table 2.2. Page 4.
 Exposure Point Concentrations for Chemicals of Concern
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Groundwater - Off-Site
Exposure Medium:	Commercial Property - South Indoor Air

Exposure Point	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual (1)			
		Minimum	Maximum	Units (1)		Value	Units (1)	Statistic (1)	Rationale (2)
Indoor Air via Vapor Intrusion from Groundwater Concentrations provided represent initial concentration in groundwater	1,1-Dichloroethane	1.8	27	ug/l	1/18	16	ug/l	97.5 Kaplan-Meier (Chebyshev) UCL	ProUCL
	Benzene	0.2	7.3	ug/l	5/18	2.2	ug/l	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL
	Carbon Tetrachloride	0.72	0.72	ug/l	1/18	0.72	ug/l	Maximum	Insufficient detects to calculate an UCL.
	Trichloroethylene	0.13	55	ug/l	17/25	10	ug/l	95% Kaplan-Meier (estimates based on bias corrected accelerated bootstrap method)	ProUCL
	Vinyl Chloride	0.4	810	ug/l	12/23	410	ug/l	99 Kaplan-Meier (Chebyshev) UCL	ProUCL

(1) Definitions: RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure; ug/l = micrograms/liter; K-M = Kaplan Meier. UCL = Upper Confidence Limit on the Mean.

* ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
Table 2.2. Page 5.
Exposure Point Concentrations for Chemicals of Concern
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Groundwater - Off-Site
Exposure Medium:	Commercial Property - West
	Indoor Air

Exposure Point	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual (1)			
		Minimum	Maximum	Units (1)		Value	Units (1)	Statistic (1)	Rationale (2)
Indoor Air via Vapor Intrusion from Groundwater Concentrations provided represent initial concentration in groundwater modeled to indoor air concentrations	1,1-Dichloroethane	0.26	41	ug/l	14/17	23	ug/l	95% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Benzene	0.2	20.0	ug/l	16/17	9.8	ug/l	95% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Ethylbenzene	0.52	23.0	ug/l	16/20	10	ug/l	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL
	Tetrachloroethylene	0.33	11.0	ug/l	9/20	3.5	ug/l	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL
	Trichloroethylene	0.06	8.8	ug/l	13/20	3.0	ug/l	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL
	Vinyl Chloride	0.2	1.9	ug/l	12/20	0.81	ug/l	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL

(1) Definitions: RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure; ug/l = micrograms/liter; K-M = Kaplan Meier. UCL = Upper Confidence Limit on the Mean.

(2) ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
Table 2.2. Page 6.
Exposure Point Concentrations for Chemicals of Concern
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe:	Current / Future
Medium	Soil Gas
Exposure Medium:	Soil Gas

Exposure Point	Chemicals of Concern	Detected Concentrations			Frequency of Detection	Exposure Point Concentration for RME and CTE Individual (1)			
		Minimum	Maximum (1)	Units (1)		Value	Units (1)	Statistic (1)	Rationale (2)
Indoor Air via Vapor Intrusion from Soil Gas	1,1,1-Trichloroethane	0.05	36000	ug/m ³	79/87	4,700	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	1,1-Dichloroethylene	0.024	4200	ug/m ³	57/87	460	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	1,2-Dichloroethane	0.044	1100 J	ug/m ³	54/87	110	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Benzene	0.13	340 J	ug/m ³	73/87	43	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Carbon Tetrachloride	0.42	6700	ug/m ³	64/87	690	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Chlorobenzene	0.04	53	ug/m ³	10/87	2.7	ug/m ³	95% Kaplan-Meier estimates using the Student's t-distribution cutoff value	ProUCL
	Chloroform	0.062	1000	ug/m ³	60/87	120	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Ethylbenzene	0.039	9700	ug/m ³	66/87	950	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Methylene chloride	0.13	1400	ug/m ³	65/87	170	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	o-dichlorobenzene	0.039	220 J	ug/m ³	31/87	41	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	p-dichlorobenzene	0.027	33 J	ug/m ³	46/87	6.7	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Tetrachloroethylene	0.27	24000	ug/m ³	82/87	3500	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Toluene	0.13	60000	ug/m ³	80/87	6900	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Trichloroethylene	0.12	110000	ug/m ³	86/87	13000	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Vinyl Chloride	0.024	5900	ug/m ³	58/87	660	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL
	Xylenes (total).	0.135	35000	ug/m ³	71/87	3900	ug/m ³	97.5% Kaplan-Meier (Chebyshev) UCL	ProUCL

(1) Definitions: RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure; ug/m³ = micrograms/cubic meter in air; K-M = Kaplan Meier. UCL = Upper Confidence Limit on the Mean; J = estimated value

(2) ProUCL is a statistical software package developed by EPA. ProUCL version 4.1 was used to calculate the Exposure Point Concentration. During development of the risk assessment, a later version of ProUCL was developed. The changes in the later version are not expected to significantly change the conclusions of the risk assessment.

ROD Human Health Risk Assessment Tables
Table 2.3a
Non-Cancer Toxicity Values - Oral/Dermal
Former Mattiace Petrochemical Facility, Glen Cove, New York

		Oral Reference Doses		Dermal (1)		Absorbed RfD for Dermal (2)			Combined Uncertainty/Modifying Factor	RfD Target Organs	
Chemicals of Concern	Chronic / Subchronic	Value	Units (3)	Value	Reference	Value	Units (3)	Primary Target Organ		Sources (3)	Date
Volatile Organic Compounds											
1,1-dichloroethane	Chronic	2E-01	mg/kg-day	1	USEPA 2004	2E-01	mg/kg-day	kidney	3000	PPRTV	5/13
1,2-dichlorobenzene	Chronic	9E-02	mg/kg-day	1	USEPA 2004	9E-02	mg/kg-day	None observed	1000	IRIS	4/13
1,2-dichloroethane (4)	Chronic	6E-03	mg/kg-day	1	USEPA 2004	6E-03	mg/kg-day	kidney	10,000	PPRTV	5/13
1,4-dichlorobenzene	Chronic	7E-02	mg/kg-day	1	USEPA 2004	7E-02	mg/kg-day	liver	100	ATSDR	5/13
1,2-dichloroethylene, cis	Chronic	2E-03	mg/kg-day	1	USEPA 2004	2E-03	mg/kg-day	kidney	3000	IRIS	4/13
2-butanone	Chronic	6E-01	mg/kg-day	1	USEPA 2004	6E-01	mg/kg-day	developmental	1000	IRIS	4/13
benzene	chronic	4E-03	mg/kg-day	1	USEPA 2004	4E-03	mg/kg-day	hematopoietic system	300	IRIS	4/13
chloroform	Chronic	1E-02	mg/kg-day	1	USEPA 2004	1E-02	mg/kg-day	liver	100	IRIS	4/13
dichloromethane	Chronic	6E-03	mg/kg-day	1	USEPA 2004	6E-03	mg/kg-day	liver	30	IRIS	4/13
ethylbenzene	Chronic	1E-01	mg/kg-day	1	USEPA 2004	1E-01	mg/kg-day	liver and kidney	1000	IRIS	4/13
tetrachloroethylene	Chronic	6E-03	mg/kg-day	1	USEPA 2004	6E-03	mg/kg-day	neurotoxicity	1000	IRIS	4/13
toluene	Chronic	8E-02	mg/kg-day	1	USEPA 2004	8E-02	mg/kg-day	kidney	3000	IRIS	4/13
trichloroethylene	Chronic	5E-04	mg/kg-day	1	USEPA 2004	5E-04	mg/kg-day	thymus, developmental toxicity	10-1,000	IRIS	4/13
vinyl chloride	Chronic	3E-03	mg/kg-day	1	USEPA 2004	3E-03	mg/kg-day	liver	30	IRIS	4/14
xylenes (total)	Chronic	2E-02	mg/kg-day	1	USEPA 2004	2E-02	mg/kg-day	decreased bodyweight, mortality	1000	IRIS	4/13
Semi-volatile Organic Compounds											
bis(2-ethylhexyl)phthalate	Chronic	2E-02	mg/kg-day	1	USEPA 2004	2E-02	mg/kg-day	liver	1000	IRIS	4/13
naphthalene	Chronic	2E-02	mg/kg-day	1	USEPA 2004	2E-02	mg/kg-day	decreased bodyweight	3000	IRIS	4/13
Pesticides											
4,4'-DDD	Chronic	NA									4/13
Metals											
Arsenic (inorganic)	Chronic	3E-04	mg/kg-day	1	EPA, 2004	3E-04	mg/kg-day	Hyperpigmentation, keratosis and possible vascular complications	3	IRIS	4/13
Cadmium (5)	Chronic	5E-04	mg/kg-day	0.025	EPA, 2004	2.5E-05	mg/kg-day	Significant proteinuria	10	IRIS	4/13
Cobalt	Chronic	3E-04	mg/kg-day	1	EPA, 2004	3E-04	mg/kg-day	Decreased iodine uptake	3000	PPRTV	5/13
Iron	Chronic	7E-01	mg/kg-day	1	EPA, 2004	7E-01	mg/kg-day	Gastrointestinal	1.5	PPRTV	5/13
Manganese	Chronic	1.4E-01	mg/kg-day	1	EPA, 2004	1.4E-01	mg/kg-day	Central Nervous System effects (other effect: Impairment of neurobehavioral function).	1	IRIS	4/13
Nickel (6)	Chronic	2E-02	mg/kg-day	1	EPA, 2004	2E-02	mg/kg-day	Decreased body and organ weights	300	IRIS	4/13

- (1) The oral absorption efficiency data was obtained from the Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final
- (2) Dermal Reference Dose (RfD) values were calculated by multiplying the oral RfD by the Oral Absorption Efficiency for Dermal consistent with EPA's Dermal Guidance (USEPA 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, (Part E, Supplemental Guidance for Dermal Risk Assessment) Final.).
- (3) Abbreviations: PPRTV - Provisional Peer Reviewed Toxicity Values; IRIS - Integrated Risk Information System; NA - not appropriate; mg/kg-day - milligrams/kilogram bodyweight/day).
- (4) The toxicity value for 1,2-dichloromethane is an PPRTV Appendix value. This designation indicates there is significant uncertainty associated with the derived value. This information is provided for completeness.
- (5) Cadmium in drinking water;
- (6) as Nickel soluble salts.

ROD Human Health Risk Assessment Tables
 Table 2.3b
 Non-Cancer Toxicity Values - Inhalation
 Former Mattiace Petrochemical Facility, Glen Cove, New York

		Inhalation Reference Concentrations.		Primary Target Organ	Combined Uncertainty/Modifying Factor	RfD Target Organs	
Chemicals of Concern	Chronic / Subchronic	Value	Units (1)			Sources (1)	Date
Volatile Organic Compounds							
1,1-dichloroethane	Chronic	NA					
1,2-dichlorobenzene	Chronic	0.2	mg/m³	decreased bodyweight	1000	HEAST	7/97
1,2-dichloroethane	Chronic	0.01	mg/m³	neurological	3000	PPRTV	5/13
1,4-dichlorobenzene	Chronic	0.8	mg/m³	liver	100	IRIS	4/13
1,2-dichloroethylene, cis	Chronic	NA					
2-butanone	Chronic	5	mg/m³	Developmental	300	IRIS	4/13
benzene	Chronic	0.03	mg/m³	Hematopoietic System	300	IRIS	4/13
carbon tetrachloride	Chronic	0.1	mg/m³	liver	100	IRIS	4/13
chloroform	Chronic	0.098	mg/m³	liver	100	ATSDR	4/13
dichloromethane	Chronic	0.6	mg/m³	liver	30	IRIS	4/13
ethylbenzene	Chronic	1	mg/m³	developmental	300	IRIS	4/13
tetrachloroethylene	Chronic	0.04	mg/m³	neurotoxicity	1000	IRIS	4/13
toluene	Chronic	5	mg/m³	neurological	10	IRIS	4/13
trichloroethylene	Chronic	0.002	mg/m³	thymus, developmental toxicity	10-100	IRIS	4/13
vinyl chloride	Chronic	0.1	mg/m³	liver	30	IRIS	4/13
xylene (total)	Chronic	0.1	mg/m³	central nervous system	300	IRIS	4/13

(1) Abbreviations: ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels; PPRTV - Provisional Peer Reviewed Toxicity Values; IRIS - Integrated Risk Information System; NA - not appropriate; mg/m³ - milligrams/cubic meter).

ROD Human Health Risk Assessment Tables
Table 2.4a
Cancer Toxicity Values - Oral/Dermal
Former Mattiace Petrochemical Facility, Glen Cove, New York

Chemicals of Concern	Oral Cancer Slope Factor					Weight of Evidence/ Cancer Guideline Description (3)		
			Oral Absorption	Absorbed Cancer Slope Factor (2)	Oral Cancer Slope Factor			
		Efficiency for Dermal (1)	for Dermal					
	Value	Units (4)		Value	Units (4)		Source(s) (4)	Date(s)
Volatile Organic Compounds								
1,1-dichloroethane	6E-03	(mg/kg-day) ⁻¹	100%	6E-03	(mg/kg-day) ⁻¹	Possible Human Carcinogen	CalEPA	5/13
1,2-dichlorobenzene	NA					Not classifiable as to carcinogenicity.	IRIS	4/13
1,2-dichloroethane	9E-02	(mg/kg-day) ⁻¹	100%	9E-02	(mg/kg-day) ⁻¹	Probable Human Carcinogen	IRIS	4/13
1,4-dichlorobenzene	5E-03		100%	5E-03	(mg/kg-day) ⁻¹	Probable Human Carcinogen	CalEPA	5/13
1,2-dichloroethylene, cis	NA					Inadequate Information to classify as carcinogen	IRIS	4/13
2-butanone	NA					Inadequate Information to classify as carcinogen	IRIS	4/13
benzene	6E-02	(mg/kg-day) ⁻¹	100%	5.5E0-2	(mg/kg-day) ⁻¹	Carinogenic to humans	IRIS	4/13
chloroform	3E-02	(mg/kg-day) ⁻¹	100%	3E-02	(mg/kg-day) ⁻¹	Probable Human Carcinogen	CalEPA	4/13
dichloromethane	2E-03	(mg/kg-day) ⁻¹	100%	2E-03	(mg/kg-day) ⁻¹	Likely to be carcinogenic to humans	IRIS	4/13
ethylbenzene	1E-02	(mg/kg-day) ⁻¹	100%	1E-02	(mg/kg-day) ⁻¹		CalEPA	5/13
tetrachloroethylene	2E-03	(mg/kg-day) ⁻¹	100%	2E-03	(mg/kg-day) ⁻¹	Likely to be carcinogenic to humans	IRIS	4/13
toluene	NA					Inadequate Information to classify as carcinogen	IRIS	4/13
trichloroethylene (MMOA)	5E-02	(mg/kg-day) ⁻¹	100%	5E-02	(mg/kg-day) ⁻¹	Carcinogenic to humans	IRIS	4/13
vinyl chloride - adult exposure (MMOA)	7E-01	(mg/kg-day) ⁻¹	100%	7E-01	(mg/kg-day) ⁻¹	Carcinogenic to humans	IRIS	4/13
vinyl chloride - exposure from birth (MMOA)	1.5E+00	(mg/kg-day) ⁻¹	100%	1.5E+00	(mg/kg-day) ⁻¹	Carcinogenic to humans	IRIS	4/13
xylene (total)	NA					Inadequate information to classify as carcinogen	IRIS	4/13
Semi-volatile Organic Compounds								
bis(2-ethylhexyl)phthalate	1E-02	(mg/kg-day) ⁻¹	100%	1E-02	(mg/kg-day) ⁻¹	Probable Human Carcinogen	IRIS	4/13
naphthalene	NA					Inadequate Information to classify as carcinogen	IRIS	4/13
Pesticides								
4,4'-DDD	2E-01	(mg/kg-day) ⁻¹	100%	2E-01	(mg/kg-day) ⁻¹	Probable Human Carcinogen	IRIS	4/13
Metals								
Arsenic (inorganic)	1.5	(mg/kg-day) ⁻¹	100%	1.5	(mg/kg-day) ⁻¹	Carcinogenic to humans	IRIS	4/13
Cadmium	NA					Not assessed for oral carcinogenicity	IRIS	4/13
Cobalt	NA							
Iron	NA							
Manganese	NA							
Nickel	NA					Not classifiable as to carcinogenicity.	IRIS	4/13

(1) Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Part E, Supplemental Guidance for Dermal Risk Assessment July 2004

(2) Based on oral cancer slope factor for Dermal exposure, if an absorption factor has been applied to humans.

(3) Cancer Weight of Evidence Classifications are based on EPA's Cancer Guidelines 1986 and 2005.

(4) Abbreviations: NA = not available; mg/kg-day = milligrams/kilogram bodyweight/day; IRIS - Integrated Risk Information System; CalEPA = California Environmental Protection

ROD Human Health Risk Assessment Tables
Table 2.4b.
Cancer Toxicity Values - Inhalation.
Former Mattiace Petrochemical Facility, Glen Cove, New York

Chemicals of Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description (2)	Unit Risk : Inhalation CSF	
	Value	Units (1)	Value (1)	Units (1)		Source(s) (1)	Date(s) (MM/DD/YYYY)
1,1-dichloroethane	1.6E-06	(ug/m ³) ⁻¹	NA		Probable Human Carcinogen	CalEPA	04/13
1,2-dichlorobenzene	NA		NA		Not Classifiable	IRIS	04/13
1,2-dichloroethane	2.6E-05	(ug/m ³) ⁻¹	NA		Probable Human Carcinogen	IRIS	04/13
1,4-dichlorobenzene	1.1E-05	(ug/m ³) ⁻¹	NA		Probable Human Carcinogen	IRIS	05/13
1,2-dichloroethylene, cis	NA		NA		Inadequate to classify as carcinogen	IRIS	05/13
2-butanone	NA		NA		Inadequate to classify as carcinogen	IRIS	04/13
benzene	7.8E-06	(ug/m ³) ⁻¹	NA		Carcinogenic to humans	IRIS	04/13
carbon tetrachloride	6.0E-06	(ug/m ³) ⁻¹	NA		Likely to be carcinogenic to humans	IRIS	04/13
chloroform	2.3E-05	(ug/m ³) ⁻¹	NA		Likely to be carcinogenic to humans	IRIS	04/13
dichloromethane	1.0E-08	(ug/m ³) ⁻¹	NA		Likely to be carcinogenic to humans	IRIS	04/13
ethylbenzene	2.5E-06	(ug/m ³) ⁻¹	NA			CalEPA	04/13
tetrachloroethylene	2.6E-07	(ug/m ³) ⁻¹	NA		Likely to be carcinogenic to humans	IRIS	04/13
toluene	NA		NA		Inadequate to classify as carcinogen	IRIS	04/13
trichloroethylene (MMOA)	4.1E-06	(ug/m ³) ⁻¹	NA		Carcinogenic to humans	IRIS	04/13
vinyl chloride - adult exposure (MMOA)	4.4E-06	(ug/m ³) ⁻¹	NA		Carcinogenic to humans	IRIS	04/13
vinyl chloride - exposure from birth (MMOA)	8.8E-06	(ug/m ³) ⁻¹	NA		Carcinogenic to humans	IRIS	04/13
xylene (total)	NA		NA		Inadequate to classify as carcinogen	IRIS	04/13

(1) Abbreviations: (ug/m³)⁻¹ - micrograms/cubic meter; IRIS - Integrated Risk Information System; CalEPA = California Environmental Protection Agency; PPRTV - Provisional Peer Reviewed Toxicity Values; NA = Not Available.

(2) Cancer Weight of Evidence Classifications are based on EPA's Cancer Guidelines 1986 and 2005.

ROD Human Health Risk Assessment Tables.
TABLE 2.5a - RME Cancer Risks and Non-Cancer Health Hazards to Current / Future Utility Worker
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current / Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	On-Site Shallow Groundwater < 15 bgs	Ethyl benzene		5.0E-09	1.0E-05		1.0E-05	Liver and kidney		0.000005	0.03	0.03
			Tetrachloroethene		7.0E-10	2.0E-06		2.0E-06	Neurotoxicity		0.0002	0.5	0.5
			Trichloroethylene		9.0E-09	1.0E-05		1.0E-05	Thymus, developmental toxicity		0.003	1.4	1.4
			Vinyl Chloride		3.0E-08	7.0E-05		7.0E-05	Liver		0.0002	0.09	0.09
			Bis(2-ethylhexyl)Phthalate			6.0E-05		6.0E-05	Liver			0.6	0.62
			1,2-Dichloroethene -cis						Kidney			3.1	3.1
			Chemical Total		4.5E-08	1.5E-04		1.5E-04			0.003	5.7	5.7
		Exposure Point Total						1.5E-04					5.7
	Exposure Medium Total							1.5E-04					5.7
Medium Total													
Total					Utility Worker - Risk Total			2E-04			Utility Worker - HI Total		5.7

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	1.4
Kidney HI Across All Media =	3.1
Liver Across All Media =	0.7
Neurotoxicity Across All Media =	0.5

ROD Human Health Risk Assessment Tables.
 TABLE 2.5b - CTE Cancer Risks and Non-Cancer Health Hazards to Utility Worker.
 RISK SUMMARY
 CENTRAL TENDENCY EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current / Future
 Receptor Population: Utility Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	On-Site Shallow Groundwater < 15 bgs	Ethyl benzene		2.0E-09	4.0E-06		4.0E-06	Liver and kidney		0.000005	0.03	0.03
			Tetrachloroethene		2.0E-10	8.0E-07		8.0E-07	Neurotoxicity		0.0002	0.5	0.5
			Trichloroethylene		3.0E-09	4.0E-06		4.0E-06	Thymus, developmental toxicity		0.003	1.4	1.4
			Vinyl Chloride		1.0E-08	2.0E-05		2.0E-05	Liver		0.0002	0.09	0.1
			Bis(2-ethylhexyl)Phthalate			2.0E-05		2.0E-05	Liver			0.6	0.6
			cis-1,2-Dichloroethene						Kidney			3.1	3.1
			Chemical Total		1.5E-08	4.9E-05		5E-05		0.0	0.003	5.72	5.7
		Exposure Point Total						5E-05					5.7
	Exposure Medium Total							5E-05					5.7
Medium Total													
Total					Utility Worker - Cancer Risk Total			5E-05			Utility Worker - HI Total		5.7

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	1.4
Kidney HI Across All Media =	3.1
Liver HI Across All Media =	0.7
Neurotoxicity HI Across All Media =	0.5

ROD Human Health Risk Assessment Tables.
 TABLE 2.6a - RME Cancer Risks and Non-Cancer Health Hazards to Current/Future Construction Worker
 RISK SUMMARY
 REASONABLE MAXIMUM EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current / Future
 Receptor Population: Construction Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	On-Site Shallow Groundwater < 15 bgs	Ethyl benzene		2.0E-09	4.0E-06		4.0E-06	Liver and kidney		0.000048	0.027	0.03
			Tetrachloroethene		2.0E-10	8.0E-07		8.0E-07	Neurotoxicity		0.0016	4.3	4.3
			Toluene						Kidney		0.000077	1.6	1.6
			Trichloroethylene		3.0E-09	4.0E-06		4.0E-06	Thymus, developmental toxicity		0.026	13	13.0
			Vinyl Chloride		1.6E-08	2.0E-05		2.0E-05	Liver		0.0017	0.79	0.8
			Bis(2-ethylhexyl)Phthalate			2.0E-05		2.0E-05	Liver			5.60	5.6
			cis-1,2-Dichloroethene						Kidney			27.0	27.0
			Chemical Total		2.1E-08	4.9E-05		4.9E-05			0.029	52.32	52.3
		Exposure Point Total						4.9E-05					52.3
	Exposure Medium Total							4.9E-05					52.3
Medium Total													
Total					Construction Worker - Cancer Risk Total			5E-05			Construction Worker - HI Total		52.3

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	13.0
Kidney HI Across All Media =	28.6
Liver HI Across All Media =	6.4
Neurotoxicity HI Across All Media =	4.3

ROD Human Health Risk Assessment Tables.
 TABLE 2.6b - CTE Cancer Risks and Non-Cancer Health Hazards to the Curren/Future Construction Worker
 RISK SUMMARY
 CENTRAL TENDENCY EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current / Future
 Receptor Population: Construction Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	On-Site Shallow Groundwater < 15 bgs	Ethyl benzene		1.0E-09	3.0E-06		3.0E-06	Liver and kidney		0.00004	0.23	0.2
			Tetrachloroethene		2.0E-10	7.0E-07		7.0E-07	Neurotoxicity		0.001	3.8	3.8
			Toluene						Kidney		0.00007	1.4	1.4
			Trichloroethylene		3.0E-09	4.0E-06		4.0E-06	Thymus, developmental toxicity		0.02	11	11.0
			Vinyl Chloride		9.0E-09	2.0E-05		2.0E-05	Liver		0.002	0.7	0.7
			Bis(2-ethylhexyl)Phthalate			2.0E-05		2.0E-05	Liver			4.9	4.9
			cis-1,2-Dichloroethene						Kidney			24.0	24.0
			Chemical Total		1.3E-08	4.8E-05		4.8E-05			0.026	46.0	46.1
		Exposure Point Total						4.8E-05					46.1
	Exposure Medium Total							4.8E-05					46.1
Medium Total													
Total					Construction Worker - Cancer Risk Total			5E-05			Construction Worker - HI Total		46.1

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	11.0
Kidney HI Across All Media =	25.4
Liver HI Across All Media =	5.6
Neurotoxicity HI Across All Media =	3.8

R2-0004922

ROD Human Health Risk Assessment Tables.
TABLE 2.7a - RME Cancer Risks and Non-Cancer Health Hazards to the Future Adult Resident

RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	7.0E-05	3.0E-04	5.0E-06		3.8E-04	Kidney	0.18		0.01	0.2		
			1,2-dichloroethane	7.0E-05	3.0E-04	3.0E-06		3.7E-04	Kidney	0.36	4.7	0.02	5.1		
			1,4-Dichlorobenzene	1.0E-06	3.0E-05	8.0E-07		3.2E-05	Liver	0.01	0.01	0.01	0.02		
			Benzene	2.0E-04	5.0E-04	3.0E-05		7.3E-04	Hematopoietic System	3.00	6.1	0.43	9.5		
			Chloroform	5.0E-05	5.0E-04	4.0E-06		5.5E-04	Liver	0.45	0.7	0.04	1.2		
			Dichloromethane	2.0E-04	2.0E-05	7.0E-06		2.3E-04	Liver	48.0	7.3	1.7	57.0		
			Ethyl benzene	3.0E-04	1.0E-03	2.0E-04		1.5E-03	Liver and kidney	0.96	1.5	0.65	3.1		
			Tetrachloroethene	5.0E-05	1.0E-04	4.0E-05		1.9E-04	Neurotoxicity	12.0	27.0	8.7	47.7		
			Toluene						Kidney	11.0	2.6	3.8	17.4		
			Trichloroethylene	5.0E-03	7.0E-03	8.0E-04		1.3E-02	Thymus, developmental toxicity	630.0	2400.0	110.0	3140.0		
			Vinyl Chloride	2.0E-02	2.0E-03	1.0E-03		2.3E-02	Liver	24.0	11.0	1.7	36.7		
			cis-1,2-dichloroethene						Kidney	460.0		55.0	515.0		
			Xylene (total)						Decreased body weight mortality	2.5	77.0	1.7	81.2		
			Bis(2-ethylhexyl)Phthalate	2.0E-06		5.0E-04		5.0E-04	Liver	0.02		4.9	4.9		
			4,4'-DDD	3.0E-07		1.0E-05		1.0E-05							
			Arsenic	3.0E-04		1.0E-06		3.0E-04	Skin, vascular	2.00		0.01	2.0		
			Cadmium						Kidney	5.10		0.47	5.6		
			Cobalt						Decreased Iodine Uptake	8.70		0.02	8.7		
			Iron						Gastrointestinal	2.70		0.01	2.7		
			Manganese						Central Nervous System	1.70		0.20	1.9		
					Chemical Total	2.6E-02	1.2E-02	2.6E-03		3.8E-02		1212.7	2537.9	189.4	3939.9
				Exposure Point Total						3.8E-02					3939.9
			Exposure Medium Total							3.8E-02					3939.9
Medium Total															
Total					Adult Resident Cancer Risk Total			4E-02			Adult Resident Noncancer HI Total		3940		

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus and Developmental HI Across All Media =	3140
Kidney HI Across All Media =	543.2
Liver HI Across All Media =	99.8
Central Nervous System and Neurotoxicity HI Across All Media =	49.6
Hematopoietic System HI Across All Media =	9.5
Liver and Kidney Systems HI Across All Media =	3.1
Decreased Body Weight, Mortality - HI Across All Media =	81.2
Increased Iodine Uptake HI Across All Media =	8.7
Gastrointestinal HI Across All Media =	2.7

R2-0004923

ROD Human Health Risk Assessment Tables.
TABLE 2.7b - RME Cancer Risks and Non-Cancer Health Hazards
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		1.0E-04			1.0E-04	Neurological		1.4		1.4
			Benzene		1.0E-05			1.0E-05	Hematopoietic System		0.1		0.1
			Carbon Tetrachloride		2.0E-04			2.0E-04	Liver		0.7		0.7
			Chloroform		1.0E-04			1.0E-04	Liver		0.1		0.1
			Ethyl benzene		1.0E-04			1.0E-04	Developmental		0.1		0.1
			Tetrachloroethene		4.0E-05			4.0E-05	Neurotoxicity		8.4		8.4
			Trichloroethylene		3.0E-03			3.0E-03	Thymus, developmental toxicity		610.0		610.0
			Vinyl Chloride		4.0E-04			4.0E-04	Liver		0.6		0.6
			Xylene (total)						Central Nervous Ssytem				3.7
			Chemical Total		4.0E-03			4.0E-03			621.4		625.1
		Exposure Point Total						4.0E-03					625.1
	Exposure Medium Total							4.0E-03					625.1
Medium Total													
Total					Adult Resident - Risk Total			4E-03			Adult Resident - HI Total		625

* Cancer risks and noncancer health hazards are pesented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	610
Liver HI Across All Media =	1.3
Neurotoxicity HI Across All Media =	9.8
Hematopoietic System HI Across All Media =	0.1
Central Nervous Sytem HI Across All Media =	3.7

ROD Human Health Risk Assessment Tables.
TABLE 2.7c - CTE Cancer Risks and Non-Cancer Health Hazards to the Future Adult Resident
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	7.0E-06	5.0E-05	9.0E-07		5.8E-05	Kidney	0.075		0.009	0.1
			1,2-dichloroethane	7.0E-06	5.0E-05	5.0E-07		5.8E-05	Kidney	0.15	3.2	0.011	3.4
			1,4-Dichlorobenzene	1.0E-07	5.0E-06	1.0E-07		5.2E-06	Liver	0.003	0.01	0.004	0.01
			Benzene	2.0E-05	8.0E-05	5.0E-06		1.1E-04	Hematopoietic System	1.20	4.1	0.29	5.59
			Chloroform	5.0E-06	9.0E-05	7.0E-07		9.6E-05	Liver	0.18	0.5	0.03	0.68
			Dichloromethane	2.0E-05	3.0E-06	1.0E-06		2.4E-05	Liver	20.0	4.9	1.1	26.0
			Ethyl benzene	3.0E-05	2.0E-04	4.0E-05		2.7E-04	Liver and kidney	0.39	1.0	0.43	1.8
			Tetrachloroethene	5.0E-06	2.0E-05	6.0E-06		3.1E-05	Neurotoxicity	4.8	18.0	5.8	28.6
			Toluene						Kidney	4.4	1.7	2.5	8.6
			Trichloroethylene	5.0E-04	1.0E-03	1.0E-04		1.6E-03	Thymus, developmental toxicity	260.0	1600.0	71.0	1931.0
			Vinyl Chloride	2.0E-03	3.0E-04	2.0E-04		2.5E-03	Liver	9.9	7.5	1.1	18.5
			cis-1,2-dichloroethene						Kidney	190.0		37.0	227.0
			Xylene (total)						Decreased body weight mortality	1.0	51.0	1.2	53.2
			Bis(2-ethylhexyl)Phthalate	2.0E-07		8.0E-05		8.0E-05	Liver	0.01		3.3	3.3
			4,4'-DDD	3.0E-08		2.0E-06		2.0E-06					
			Arsenic	3.0E-05		2.0E-07		3.0E-05	Skin, vascular	0.81		0.01	0.8
			Cadmium						Kidney	2.10		0.30	2.4
			Cobalt						Decreased Iodine Uptake	3.50		0.01	3.5
			Iron						Gastrointestinal	1.10		0.01	1.1
			Manganese						Central Nervous System	0.71		0.13	0.8
			Chemical Total	2.6E-03	1.8E-03	4.4E-04		4.5E-03		500.3	1691.9	124.1	2316.4
		Exposure Point Total						4.5E-03					2316.4
	Exposure Medium Total							4.5E-03					2316.4
Medium Total													
Total				Adult Resident Risk Total				5E-03			Adult Resident HI Total =		2316

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	1931
Kidney HI Across All Media =	241.4
Liver HI Across All Media =	48.5
Central Nervous System and Neurotoxicity HI Across All Media =	29.4
Hematopoietic System HI Across All Media =	5.6
Liver and Kidney Systems HI Across All Media =	1.8
Decreased Body Weight, Mortality =	53.2
Decreased Iodine Uptake =	3.5
Gastrointestinal HI Across All Media =	1.1

R2-0004925

ROD Human Health Risk Assessment Tables.
TABLE 2.7d CTE Cancer Risks and Non-Cancer Health Hazards to Future Adult Resident
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern										
				Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		2.0E-05			2.0E-05	Neurological		0.9		0.9
			Benzene		3.0E-06			3.0E-06	Hematopoietic System		0.1		0.1
			Carbon Tetrachloride		3.0E-05			3.0E-05	Liver		0.4		0.4
			Chloroform		2.0E-05			2.0E-05	Liver		0.1		0.1
			Ethyl benzene		2.0E-05			2.0E-05	Developmental		0.1		0.1
			Tetrachloroethene		7.0E-06			7.0E-06	Neurotoxicity		5.6		5.6
			Trichloroethylene		1.0E-03			1.0E-03	Thymus, developmental toxicity		410.0		410.0
			Vinyl Chloride		3.0E-04			3.0E-04	Liver		0.4		0.4
			Chemical Total		1.4E-03			1.4E-03			417.6		417.6
						1.4E-03					417.6		
											417.6		
Medium Total													
Total					Adult Risk Total		1E-03		Adult HI Total		418		

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	410
Liver HI Across All Media =	0.9
Neurotoxicity HI Across All Media =	5.6
Hematopoietic System HI Across All Media =	0.1

ROD Human Health Risk Assessment Tables.
TABLE 2.8a - RME Cancer Risks and Non-Cancer Health Hazards to Future Resident Child
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemicals of Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	5.0E-05	8.0E-05	3.0E-06		1.3E-04	Kidney	0.52		0.03	0.5
			1,2-Dichlorobenzene						None Observed	0.32	0.76	0.19	1.3
			1,2-dichloroethane	5.0E-05	7.0E-05	2.0E-06		1.2E-04	Kidney	1.00	4.7	0.04	5.7
			1,4-Dichlorobenzene	7.0E-07	7.0E-06	4.0E-07		8.1E-06	Liver	0.02	0.01	0.01	0.04
			2-Butanone						Developmental	0.69	0.44	0.00	1.13
			Benzene	2.0E-04	1.0E-04	2.0E-05		3.2E-04	Hematopoietic System	8.50	6.1	0.89	15.5
			Chloroform	3.0E-05	1.0E-04	2.0E-06		1.3E-04	Liver	1.30	0.7	0.09	2.1
			Dichloroethane	1.0E-04	4.0E-06	4.0E-06		1.1E-04	Liver	140.0	7.3	3.5	150.8
			Ethyl benzene	2.0E-04	3.0E-04	1.0E-04		6.0E-04	Liver and kidney	2.70	1.5	1.40	5.6
			Tetrachloroethene	4.0E-05	2.0E-05	2.0E-05		8.0E-05	Neurotoxicity	33.0	27.0	17.0	77.0
			Toluene						Kidney	30.0	2.6	7.2	39.8
			Trichloroethylene	7.0E-03	3.0E-03	8.0E-04		1.1E-02	Thymus, developmental toxicity	1800.0	2400.0	220.0	4420.0
			Vinyl Chloride	3.0E-02	8.0E-04	1.0E-03		3.2E-02	Liver	69.0	11.0	3.7	83.7
			cis-1,2-dichloroethene						Kidney	1300.0		110.0	1410.0
			Xylene (total)						Decreased body weight, mortality	7.2	77.0	3.8	88.0
			Bis(2-ethylhexyl)Phthalate	1.0E-06		2.0E-04		2.0E-04	Liver	0.05		8.3	8.3
			Napthalene						Decreased body weight	1.40		0.8	2.2
			4,4'-DDD	2.0E-07		4.0E-06		4.2E-06					
			Arsenic	2.0E-04		1.0E-06		2.0E-04	Skin, vascular	5.70		0.03	5.7
			Cadmium						Kidney	15.00		1.40	16.4
			Cobalt						Decreased Iodine Uptake	25.00		0.05	25.0
			Iron						Gastrointestinal	7.80		0.04	7.8
			Manganese						Central Nervous System	4.90		0.58	5.5
			Nickel						Decreased body and organ weights	2.20		0.05	2.3
			Chemical Total	3.8E-02	4.5E-03	2.2E-03		4.4E-02		3401.4	2539.1	376.9	6317.5
		Exposure Point Total						4.4E-02					6317.5
	Exposure Medium Total							4.4E-02					6317.5
Medium Total													
Total					Residential Child - Risk Total			4E-02			Residential Child - HI Total		6317

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	4420
Kidney HI Across All Media =	1472.5
Liver HI Across All Media =	245.0
Neurotoxicity HI Across All Media =	82.5
Hematopoietic System HI Across All Media =	15.5

R2-0004927

ROD Human Health Risk Assessment Tables.
TABLE 2.8b RME Cancer Risks and Non-Cancer Health Hazards to Future Residential Child
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		1.0E-04			1.0E-04	Neurological		1.4		1.4
			Benzene		1.0E-05			1.0E-05	Hematopoietic System		0.1		0.1
			Carbon Tetrachloride		2.0E-04			2.0E-04	Liver		0.7		0.7
			Chloroform		1.0E-04			1.0E-04	Liver		0.1		0.1
			Ethyl benzene		1.0E-04			1.0E-04	Developmental		0.1		0.1
			p-Dichlorobenzene		3.0E-06			3.0E-06	Liver		0.00081		0.001
			Tetrachloroethene		4.0E-05			4.0E-05	Neurotoxicity		8.4		8.4
			Trichloroethylene		3.0E-03			3.0E-03	Thymus, developmental toxicity		610.0		610.0
			Vinyl Chloride		4.0E-04			4.0E-04	Liver		0.6		0.6
			Chemical Total		4.0E-03			4.0E-03			621.4		621.4
		Exposure Point Total						4.0E-03					621.4
	Exposure Medium Total							4.0E-03					621.4
Medium Total													
Total					Residential Child - Risk Total			4E-03			Residential Child HI Total		621

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	610
Liver HI Across All Media =	1.4
Neurotoxicity HI Across All Media =	9.8
Hematopoietic System HI Across All Media =	0.1

ROD Human Health Risk Assessment Tables.
TABLE 2.8c. CTE Cancer Risks and Non-Cancer Health Hazards for Future Child Resident
RISK SUMMARY
CENTRAL TENDENCY EXPOSURE
Former Matlacci Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern										
				Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	8.0E-06	3.0E-05	9.0E-07		3.9E-05	Kidney	0.17	0.25	0.02	0.4
			1,2-Dichlorobenzene					None Observed	0.10	0.51	0.13	0.7	
			1,2-dichloroethane	8.0E-06	2.0E-05	5.0E-07		2.9E-05	Kidney	0.34	3.2	0.02	3.6
			1,4-Dichlorobenzene	1.0E-07	2.0E-06	1.0E-07		2.2E-06	Liver	0.01	0.01	0.01	0.02
			2-Butanone					Developmental	0.22	0.30	0.003	0.52	
			Benzene	3.0E-05	4.0E-05	6.0E-06		7.6E-05	Hematopoietic System	2.80	4.1	0.59	7.5
			Chloroform	6.0E-06	5.0E-05	8.0E-07		5.7E-05	Liver	0.42	0.5	0.06	0.9
			Dichloromethane	2.0E-05	1.0E-06	1.0E-06		2.2E-05	Liver	44.0	4.9	2.4	51.3
			Ethyl benzene	4.0E-05	1.0E-04	4.0E-05		1.8E-04	Liver and kidney	0.89	1.0	0.95	2.8
			Tetrachloroethene	6.0E-06	8.0E-06	6.0E-06		2.0E-05	Neurotoxicity	11.0	18.0	12.0	41.0
			Toluene					Kidney	9.9	1.7	4.8	16.4	
			Trichloroethylene	1.0E-03	1.0E-03	3.0E-04		2.3E-03	Thymus, developmental toxicity	580.0	1600.0	150.0	2330.0
			Vinyl Chloride	4.0E-03	3.0E-04	5.0E-04		4.8E-03	Liver	23.0	7.5	2.5	33.0
			cis-1,2-dichloroethene					Kidney	430.0		76.0	506.0	
			Xylene (total)					Decreased body weight, mortality	2.3	51.0	2.6	55.9	
			Bis(2-ethylhexyl)Phthalate	2.0E-07		7.0E-05		7.0E-05	Liver	0.02		5.6	5.6
			Napthalene					Decreased body weight	0.44		0.5	1.0	
			4,4'-DDD	3.0E-08		1.0E-06		1.0E-06					
			Arsenic	4.0E-05		3.0E-07		4.0E-05	Skin, vascular	1.80		0.02	1.8
			Cadmium						Kidney	4.70		0.91	5.6
			Cobalt						Decreased Iodine Uptake	8.00		0.03	8.0
			Iron						Gastrointestinal	2.50		0.02	2.5
			Manganese						Central Nervous System	1.60		0.39	2.0
	Nickel						Decreased body and organ weights	0.73		0.04	0.8		
			Chemical Total	5.2E-03	1.6E-03	9.3E-04		7.4E-03		1124.9	1692.9	259.1	3064.1
		Exposure Point Total						7.4E-03					3064.1
	Exposure Medium Total							7.4E-03					3064.1
Medium Total													
Total					Residential Child - Risk Total			7E-03		Residential Child - HI Total			3064

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =	2330
Kidney HI Across All Media =	532.0
Liver HI Across All Media =	90.9
Neurotoxicity HI Across All Media =	43.0
Hematopoietic System HI Across All Media =	7.5
Liver and Kidney HI Across All Media =	2.8
Decreased Iodine Uptake - HI Across All Media =	8
Neurotoxicity and Central Nervous Sytem - HI Across All Media =	43
Decreased Bodyweight and Organ Weights - HI Across All Media =	0.8
Decreased Bodyweight, Mortality - HI Across All Media =	55.9

R2-0004929

ROD Human Health Risk Assessment Tables.
 TABLE 2.8d - CTE Cancer Risks and Non-Cancer Health Hazards to Future Residential Child
 RISK SUMMARY
 CENTRAL TENDENCY EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
 Receptor Population: Resident
 Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		2.0E-05			2.0E-05	Neurological		0.9		0.9
			Benzene		3.0E-06			3.0E-06	Hematopoietic System		0.1		0.1
			Carbon Tetrachloride		3.0E-05			3.0E-05	Liver		0.4		0.4
			Chloroform		2.0E-05			2.0E-05	Liver		0.1		0.1
			Ethyl benzene		2.0E-05			2.0E-05	Developmental Neurotoxicity		0.1		0.1
			Tetrachloroethene		7.0E-06			7.0E-06	Thymus, developmental toxicity		5.6		5.6
			Trichloroethylene		1.0E-03			1.0E-03	Liver		410.0		410.0
			Vinyl Chloride		3.0E-04			3.0E-04			0.3		0.3
			Chemical Total		1.4E-03			1.4E-03			417.4		417.4
		Exposure Point Total						1.4E-03					417.4
	Exposure Medium Total							1.4E-03					417.4
Medium Total													
Total					Residential Child - Risk Total			1E-03			Residential Child - HI Total		417

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	410
Liver HI Across All Media =	0.8
Neurological and Neurotoxicity HI Across All Media =	6.5
Hematopoietic System HI Across All Media =	0.1

ROD Human Health Risk Assessment Tables.
TABLE 2.9a. - RME Cancer Risks and Non-Cancer Health Hazards for On-Site Industrial/Commercial Worker
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: On-Site Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	2.0E-05	8.0E-05	4.0E-06		1.0E-04	Kidney	0.06		0.00096	0.1
			1,2-dichloroethane	2.0E-05	7.0E-05	2.0E-06		9.2E-05	Kidney	0.11	1.1	0.01	1.2
			1,4-Dichlorobenzene	3.0E-07	7.0E-06	6.0E-07		7.9E-06	Liver	0.002	0.002	0.005	0.01
			Benzene	7.0E-05	1.0E-04	2.0E-05		1.9E-04	Hematopoietic System	0.93	1.4	0.31	2.6
			Chloroform	2.0E-05	1.0E-04	3.0E-06		1.2E-04	Liver	0.14	0.2	0.03	0.3
			Dichloromethane	6.0E-05	4.0E-06	5.0E-06		6.9E-05	Liver	15.0	1.7	1.2	17.9
			Ethyl benzene	1.0E-04	3.0E-04	2.0E-04		6.0E-04	Liver and kidney	0.30	0.4	0.46	1.1
			Tetrachloroethene	2.0E-05	2.0E-05	3.0E-05		7.0E-05	Neurotoxicity	3.7	6.4	6.2	16.3
			Toluene						Kidney	3.3	0.6	2.7	6.6
			Trichloroethylene	2.0E-03	2.0E-03	6.0E-04		4.6E-03	Thymus, developmental toxicity	200.0	570.0	76.0	846.0
			Vinyl Chloride	6.0E-03	4.0E-04	9.0E-04		7.3E-03	Liver	7.6	2.7	1.2	11.5
			cis-1,2-dichloroethene						Kidney	140.0		39.0	179.0
			Bis(2-ethylhexyl)Phthalate	5.0E-07		3.0E-04		3.0E-04	Liver	0.01		3.5	3.5
			4,4'-DDD	9.0E-08		7.0E-06		7.1E-06					
			Arsenic	1.0E-04		1.0E-06		1.0E-04	Skin, vascular	0.62		0.01	0.6
			Cadmium						Kidney	1.60		0.30	1.9
			Cobalt						Decreased Iodine Uptake	2.70		0.01	2.7
			Iron						Gastrointestinal	0.85		0.01	0.9
			Chemical Total	8.4E-03	3.1E-03	2.1E-03		1.3E-02		376.9	584.4	130.9	1092.3
		Exposure Point Total						1.3E-02					1092.3
	Exposure Medium Total							1.3E-02					1092.3
Medium Total													
Total					Adult Commercial/Insutrial Worker Risk Total			1E-02			Adult Commercial/Insutrial Worker HI Total		1092

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental HI Across All Media =	846
Kidney HI Across All Media =	188.8
Liver HI Across All Media =	33.3
Central Nervous System and Neurotoxicity HI Across All Media =	16.3
Hematopoietic System HI Across All Media =	2.6
Liver and Kidney Systems HI Across All Media =	1.1
Decreased Iodine Uptake =	2.7
Gastrointestinal HI Across All Media =	0.9

R2-0004931

ROD Human Health Risk Assessment Tables.
TABLE 2.9b- RME Cancer Risks and Non-Cancer Health Hazards for On-Site Industrial/Commercial Worker
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: On-Site Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		2.0E-05			2.0E-05	Neurological		0.3		0.3
			Benzene		3.0E-06			3.0E-06	Hematopoietic System		0.03		0.03
			Carbon Tetrachloride		3.0E-05			3.0E-05	Liver		0.2		0.2
			Chloroform		2.0E-05			2.0E-05	Liver		0.028		0.028
			Ethyl benzene		2.0E-05			2.0E-05	Developmental		0.022		0.022
			Tetrachloroethene		7.0E-06			7.0E-06	Neurotoxicity		2.0		2.0
			Trichloroethylene		4.0E-04			4.0E-04	Thymus, developmental toxicity		150.0		150.0
			Vinyl Chloride		2.0E-05			2.0E-05	Liver		0.15		0.15
			Chemical Total		5.2E-04			5.2E-04			152.7		152.7
		Exposure Point Total						5.2E-04					152.7
	Exposure Medium Total							5.2E-04					152.7
Medium Total													
Total					Adult On-Site Industrial/Commercial Worker Risk Total			5E-04			Adult On-Site Industrial/Commercial Worker HI Total		153

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus and Developmental HI Across All Media =	150
Liver HI Across All Media =	0.7
Neurotoxicity HI Across All Media =	2.3
Hematopoietic System HI Across All Media =	0.03
Liver HI Across All Media =	0.3

ROD Human Health Risk Assessment Tables.
TABLE 2.9c CTE Cancer Risks and Non-Cancer Health Hazards to On-Site Industrial/Commercial Worker
RISK SUMMARY

CENTRAL TENDENCY EXPOSURE
Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: On-Site Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	1,1-Dichloroethane	7.0E-06	2.0E-05	1.0E-06		2.8E-05	Kidney	0.05		0.00840	0.1
			1,2-dichloroethane	7.0E-06	2.0E-05	7.0E-07		2.8E-05	Kidney	0.10	1.0	0.01	1.1
			1,4-Dichlorobenzene	1.0E-07	2.0E-06	2.0E-07		2.3E-06	Liver	0.002	0.002	0.004	0.0
			Benzene	2.0E-05	4.0E-05	8.0E-06		6.8E-05	Hematopoietic System	0.81	1.3	0.27	2.4
			Chloroform	5.0E-06	4.0E-05	1.0E-06		4.6E-05	Liver	0.12	0.2	0.03	0.3
			Dichloromethane	2.0E-05	1.0E-06	2.0E-06		2.3E-05	Liver	13.0	1.5	1.0	15.5
			Ethyl benzene	3.0E-05	1.0E-04	5.0E-05		1.8E-04	Liver and kidney	0.26	0.3	0.41	1.0
			Tetrachloroethene	5.0E-06	8.0E-06	9.0E-06		2.2E-05	Neurotoxicity	3.2	5.6	5.4	14.2
			Toluene						Kidney	2.9	0.5	2.4	5.8
			Trichloroethylene	5.0E-04	5.0E-04	2.0E-04		1.2E-03	Thymus, developmental toxicity	170.0	500.0	66.0	736.0
			Vinyl Chloride	2.0E-03	1.0E-04	3.0E-04		2.4E-03	Liver	6.7	2.3	1.0	10.0
			cis-1,2-dichloroethene						Kidney	130.0		34.0	164.0
			Bis(2-ethylhexyl)Phthalate	2.0E-07		1.0E-04		1.0E-04	Liver	0.005		3.1	3.1
			4,4'-DDD	3.0E-08		2.0E-06		2.0E-06					
			Xylene (total)						Central Nervous System	0.69	16.00	1.10	17.8
			Arsenic	3.0E-05		3.0E-07		3.0E-05	Skin, vascular	0.54		0.006	0.5
			Cadmium						Kidney	1.40		0.29	1.7
			Cobalt						Decreased Iodine Uptake	2.40		0.01	2.4
			Iron						Gastrointestinal	0.74		0.01	0.7
			Chemical Total	2.6E-03	8.3E-04	6.7E-04		3.9E-03		332.9	528.7	115.0	976.6
		Exposure Point Total						3.9E-03					976.6
	Exposure Medium Total							3.9E-03					976.6
Medium Total													
Total					Adult Risk Total			4E-03			Adult HI Total		977

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus, Developmental Toxicity HI Across All Media =
Kidney HI Across All Media =
Liver HI Across All Media =
Central Nervous System and Neurotoxicity HI Across All Media =
Hematopoietic System HI Across All Media =
Liver and Kidney Systems HI Across All Media =
Decreased Iodine Uptake HI Across All Media=
Gastrointestinal HI Across All Media =

736
172.7
28.9
32.0
2.4
1
2.4
0.7

ROD Human Health Risk Assessment Tables.
 TABLE 2.9d - CTE Cancer Risks and Non-Cancer Health Hazards Future On-Site Industrial/Commercial Worker
 RISK SUMMARY
 CENTRAL TENDENCY EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
 Receptor Population: On-Site Industrial /
 Commercial Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil Gas	Soil Gas	Indoor Air	1,2-dichloroethane		7.0E-06			7.0E-06	Neurological		0.3		0.3
			Benzene		9.0E-07			9.0E-07	Hematopoietic System		0.03		0.03
			Carbon Tetrachloride		1.0E-05			1.0E-05	Liver		0.1		0.1
			Chloroform		7.0E-06			7.0E-06	Liver		0.024		0.02
			Ethyl benzene		6.0E-06			6.0E-06	Developmental		0.019		0.02
			Tetrachloroethene		2.0E-06			2.0E-06	Neurotoxicity		1.7		1.7
			Trichloroethylene		1.0E-04			1.0E-04	Thymus, developmental toxicity		130.0		130.0
			Vinyl Chloride		7.0E-06			7.0E-06	Liver		0.13		0.13
			Chemical Total		1.4E-04			1.4E-04			132.3		132.3
		Exposure Point Total						1.4E-04					132.3
	Exposure Medium Total							1.4E-04					132.3
Medium Total													
Total					Adult On-Site Industrial/Commercial Risk Total			1E-04			Adult On-Site Industrial/Commercial HI Total		132

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Thymus and Developmental HI Across All Media =	130
Liver HI Across All Media =	0.2
Neurological and Neurotoxicity HI Across All Media =	2.0
Hematopoietic System HI Across All Media =	0.03

ROD Human Health Risk Assessment Tables.

TABLE 2.10a - RME Cancer Risks and Non-Cancer Health Hazards to Off-Site (South) Industrial/Commercial Worker South Property

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current
Receptor Population: Off-Site Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Off-Site Commercial Property Groundwater South	Air	Indoor Air	Vinyl Chloride		1.0E-04			1.0E-04	Liver		0.8		0.8
			Chemical Total		1.0E-04			1.0E-04			0.8		0.8
		Exposure Point Total						1.0E-04					0.8
		Exposure Medium Total						1.0E-04					0.8
	Medium Total												
Total					Off-Site Industrial/Commercial Worker Risk Total			1E-04			Off-Site Industrial/Commercial Adult HI Total		1

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Liver HI Across All Media = 0.8

ROD Human Health Risk Assessment Tables.
 TABLE 2.10b - CTE Cancer Risks and Non-Cancer Health Hazards to Off-Site Industrial (South) /Commercial Worker South Property
 RISK SUMMARY
 CENTRAL TENDENCY EXPOSURE
 Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Current
 Receptor Population: Off-Site (South) Industrial /
 Commercial Worker
 Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Off-Site Commercial Property Groundwater South	Air	Indoor Air	Vinyl Chloride		4.0E-05			4.0E-05	Liver		0.8		0.8
			Chemical Total		4.0E-05			4.0E-05			0.8		0.8
		Exposure Point Total						4.0E-05					0.8
	Exposure Medium Total							4.0E-05					0.8
Medium Total													
Total					Off-Site Industrial/Commercial Worker Risk Total			4E-05			Off-Site Industrial/Commercial Adult HI Total		1

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Liver HI Across All Media = 0.8

ROD Human Health Risk Assessment Tables.

TABLE 2.11a RME Cancer Risks and Non-Cancer Health Hazards Off-Site Industrial / Commercial Worker West Property

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Off-Site (West) Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Off-Site Commercial Property Groundwater - West	Air	Indoor Air	1,2-dichloroethane		4.0E-07			4.0E-07	Neurological		NA		NA
			Benzene		9.0E-07			9.0E-07	Hematopoietic System		0.01		0.01
			Ethyl benzene		4.0E-07			4.0E-07	Developmental		0.0004		0.0004
			Tetrachloroethylene		3.0E-08			3.0E-08	Neurotoxicity		0.0082		0.0082
			Trichloroethylene		2.0E-07			2.0E-07	Thymus, developmental toxicity		0.082		0.08
			Vinyl Chloride		2.0E-07			2.0E-07	Liver		0.002		0.002
			Chemical Total		2.1E-06			2.1E-06			0.10		0.10
		Exposure Point Total						2.1E-06					0.10
	Exposure Medium Total							2.1E-06					0.10
Medium Total													
Total					Off-Site Industrial Commercial Worker Adult Risk Total			2E-06			Adult HI Total		0.10

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

ROD Human Health Risk Assessment Tables.

TABLE 2.11b CTE Cancer Risks and Non-Cancer Health Hazards Off-Site Industrial / Commercial Worker West Property

RISK SUMMARY

CENTRAL TENDENCY EXPOSURE

Former Mattiace Petrochemical Facility, Glen Cove, New York

Scenario Timeframe: Future
Receptor Population: Off-Site (West) Industrial /
Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemicals of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Off-Site Commercial Property Groundwater - West	Air	Indoor Air	1,2-dichloroethane		1.0E-07			1.0E-07	Neurological		NA		NA
			Benzene		3.0E-07			3.0E-07	Hematopoietic System		0.01		0.01
			Ethyl benzene		1.0E-07			1.0E-07	Developmental		0.0004		0.0004
			Tetrachloroethylene		1.0E-08			1.0E-08	Neurotoxicity		0.0072		0.0072
			Trichloroethylene		8.0E-08			8.0E-08	Thymus, developmental toxicity		0.072		0.07
			Vinyl Chloride		8.0E-08			8.0E-08	Liver		0.001		0.001
			Chemical Total		6.7E-07			6.7E-07			0.09		0.09
		Exposure Point Total						6.7E-07					0.09
	Exposure Medium Total							6.7E-07					0.09
Medium Total													
Total					Off-Site Industrial Commercial Worker (West) Adult Risk Total			7E-07			Off-Site Industrial Commercial Worker (West) Adult Risk Total		0.09

* Cancer risks and noncancer health hazards are presented with one significant digit consistent with guidance (USEPA, 1989).

Table 3. Summary of Potential Chemical-Specific Groundwater ARARS and TBCs and Selected Criteria

Chemicals	Federal ARAR¹	NY ARAR and (Groundwater Quality Standards)³ and TBCs⁴	EPA Calculated Risk-Based Concentration⁵	Selected Criteria
	ppb	ppb	ppb	ppb
<i>Volatile Organic Compounds</i>				
2-Butanone (MEK)	-	50	-	50
Chloroform	-	7	-	7
Cis-1,2-dichloroethene	70	5*	-	5*
1,2-dichlorobenzene	600	3	-	3
1,2-dichloroethane	5	0.6	-	0.6
Dichloromethane	5	-	-	5
Ethylbenzene	700	5*	-	5*
Tetrachloroethylene (PCE)	5	5*	-	5*
1,1,1-Trichloroethane	200	5*	-	5*
Trichloroethene (TCE)	5	5*	-	5*
Vinyl chloride	2	2	-	2
1,1-Dichloroethane	-	5	-	5
1,4-Dichlorobenzene	-	3	-	3
Benzene	5	1	-	1
Toluene	1,000	5	-	5
Xylene	10,000	5*	-	5*
<i>Semi-volatile Organic Compounds</i>				
Naphthalene	-	10	-	10
Bis(2-ethylhexylphthalate)	-	5	-	5
			-	
<i>Pesticides</i>				
4,4'-DDD	-	0.3	-	0.3
			-	
<i>Metals</i>				
		NY MCL²		
Manganese	-	300	430 ⁶	430
Arsenic	10	25	-	10
Cadmium	5	5	-	5
Cobalt	-	5	-	5
Iron	-	300	14,000	14,000
Nickel	-	100	-	100

*Principal Organic Contaminant standard

- No criterion established

¹ 40 CFR Part 141.

² 10 NYCRR 5-1.

³ Groundwater Quality Standard - 6 NYCRR 703.

⁴ NYC – TBC – from Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 June 1998 last revised in 2004: Class GA Groundwater.

⁵ EPA calculated concentrations based on the risk to human health for iron and manganese. The NY MCL is a secondary standard which is based on aesthetics.

⁶ The IRIS RfD (0.14 mg/kg-day) used in the calculation of hazards includes manganese from all sources, including diet. The author of the IRIS assessment for manganese recommended that the dietary contribution from the normal U.S. diet (an upper limit of 5 mg/day) be subtracted when evaluating non-food (e.g., drinking water or soil) exposures to manganese, leading to a RfD of 0.071 mg/kg-day for non-food items. The explanatory text in IRIS further recommends using a modifying factor of 3 when calculating risks associated with non-food sources due to a number of uncertainties that are discussed in the IRIS file for manganese, leading to a RfD of 0.024 mg/kg-day. The non-cancer hazards calculated in this BHHRA were calculated using the IRIS RfD of 0.14 mg/kg-day which may underestimate the hazards by a factor of 5.8.

TABLE 4
PRELIMINARY IDENTIFICATION OF LOCATION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Sole Source Aquifer --			
Safe Drinking Water Act	40 CFR 149 - Protection of Ground Water Used for Potable Water Supply	Provides protection of designated aquifers from actions by federally-funded programs.	While the Site is located in an area designated by the USEPA as a sole source aquifer (the Nassau-Suffolk sole source aquifer); remediation is being paid for by private parties, not federal funds.
Coastal Resources --			
Coastal Zone Management Act	16 U.S.C. 1451	Encourages states to preserve, protect, develop, and where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, and estuaries, as well as the fish and wildlife using those habitats; participation by states is voluntary.	To-be-considered as the Site is located in a state-designated coastal zone.
New York State Coastal Management Program	Significant Fish and Wildlife Habitat Policies 7 and 8	Requires that a Consistency Determination be obtained for activities proposed within Significant Fish and Wildlife Habitats	To-be-considered as the Site is located in a designated coastal zone adjacent to the designated Hempstead Harbor Significant Coastal Fish and Wildlife Habitat.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Comprehensive Environmental Response, Compensation, and Liability Act of 1980	42 U.S.C. 9605 and 40 CFR 300 (National Contingency Plan)	Establishes funding and provisions for the clean-up of Superfund sites.	ARARs as the Site is on the National Priorities List.
Superfund Amendments and Reauthorization Act	42 U.S.C. 9601	Treatments must provide permanent reductions in volume, toxicity and mobility of wastes and satisfy ARARs.	ARARs as the Site is on the National Priorities List.
Hazardous and Solid Waste Amendments of 1984 (HSWA)	42 U.S.C. 6924, 40 CFR 260.1 et seq.	Requires the treatment of certain wastes prior to land disposal.	Potential ARARs that may limit the use of land disposal in remediating certain wastes.
Resource Conservation and Recovery Act (RCRA)	40 CFR Part 262	Standards for manifesting, making and recording off-site waste shipments for treatment/disposal.	Potential ARARs for alternatives that utilize off-site treatment/disposal of hazardous waste.
RCRA	40 CFR 263	Standards for transporters of hazardous waste materials.	Potential ARARs for alternatives that utilize off-site treatment/disposal of hazardous waste.
RCRA	40 CFR 264 and 265	Outlines specifications and standards for design, operation, closure and monitoring of hazardous waste storage, treatment and disposal facilities.	Potential ARARs for alternatives that utilize a surface impoundment, waste pile, landfill, land treatment or incineration for on-site disposal/ treatment of wastes.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
RCRA	40 CFR 264 Subpart I	Standards for the storage of containers of hazardous wastes, including inspection, containment and closure requirements.	Potential ARARs for alternatives that involve the on-site storage of hazardous wastes within containers.
RCRA	40 CFR 264 Subpart J	Standards for the storage or treatment of hazardous wastes within tank systems.	Potential ARARs for alternatives that involve the on-site storage or treatment of hazardous wastes within tank systems.
RCRA	40 CFR 264 Subpart AA, BB, and CC	Standards for air emissions from process vents, equipment leaks, and tanks, surface impoundments, and containers used to store or treat hazardous wastes.	Potential ARARs for alternatives that store or treat hazardous wastes on the Site.
RCRA	40 CFR 264 Subpart DD	Standards for the storage or treatment of hazardous wastes in buildings.	Potential ARARs for alternatives that store or treat hazardous wastes on site within containment buildings.
RCRA	40 CFR 268	Identifies hazardous wastes that are restricted from land disposal and sets treatment standards for restricted wastes.	Potential ARARs that may limit the use of land disposal in remediating certain hazardous wastes.
National Contingency Plan	40 CFR 300.440	Describes procedures for managing CERCLA response action wastes at off-site facilities.	Potential ARAR for alternatives in which wastes are transferred off-site; Requires that wastes be transferred to facilities that are in compliance with RCRA, TSCA, or other applicable federal and state requirements.
90-Day Accumulation Rule for Hazardous Waste	40 CFR Part 262.34	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers, and containment buildings without having to obtain a RCRA hazardous waste permit	Potentially applicable to remedial alternatives that involve the storing or treating of hazardous materials onsite.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Clean Water Act (CWA) - Discharge to the Waters of the United States	40 CFR Parts 403, and 230 Section 404 (b) (1), 33 USC 1344	Establishes site-specific pollutant limitations and performance standards that are designed to protect surface water quality. Types of discharges regulated under CWA include: indirect discharge to a POTW, and discharge of dredged or fill material into U.S. waters.	Potentially applicable to remedial alternatives that involve regulated discharges.
CWA Section 401	33 U.S.C. 1341	Requires that 401 Water Quality Certification permit be provided to federal permitting agency (USACE) for any activity including, but not limited to, the construction or operation of facilities that may result in any discharge into jurisdictional waters of the U.S. and/or state.	Potentially applicable to remedial alternatives that involve regulated discharges.
Safe Drinking Water Act	40 CFR 144 and 146	Provides the general requirements, technical criteria and standards for underground injection wells, including prohibitions of unauthorized injection, prohibition of movement of fluid into underground sources of drinking water, and requirements for the discharge of hazardous wastes.	Potential ARAR for alternatives that utilize underground injection as a remedial method.
Clean Air Act	40 CFR 50	Establishes maximum concentrations for particulates, ozone, lead and fugitive dust emissions.	Potential ARARs for alternatives involving treatment methods that impact ambient air (e.g., soil venting).
Protection of Significant Deterioration of Air Quality (PSD)	40 CFR Part 51.2	New major stationary sources may be subject to PSD review (i.e., require best available control technology (BACT), lowest achievable detection limit (LAEL), and/ or emissions off-sets.	If necessary, PSD procedures will be included in the remedial design/ remedial action process. The procedures could be expanded to BACT and LAEL evaluations.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Clean Air Act	40 CFR 50	Requires Best Available Control Technology (BACT) for new sources, and sets emissions limitations.	Potential ARARs for alternatives involving treatment methods that impact ambient air (e.g., soil venting).
National Emissions Standards for Hazardous Air Pollutants (NESHAP)	40 CFR 61	Establishes emissions limitations for hazardous air pollutants.	Potential ARARs for alternatives using treatment methods that result in emissions to the air.
Standards Applicable to Transporters of Applicable Hazardous Waste - RCRA Section 3003	40 CFR Parts 170-179, 262, and 263	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation, and management of the waste. Requires manifesting, recordkeeping, and immediate action in the event of a discharge.	These requirements will be applicable to the transport of hazardous material from the Site.
Hazardous Materials Transportation Act	49 CFR 170, 171	Procedures for packaging, labeling, manifesting, and off-site transport of hazardous materials.	Potential ARARs for alternatives involving the off-site shipment of hazardous materials or waste.
Occupational Safety and Health Act (OSHA)	29 CFR 1910	Establishes requirement for 40-hour training and medical surveillance of hazardous waste workers.	Potential ARAR for workers and the workplace throughout the implementation of hazardous activities.
OSHA	29 CFR 1926	Regulations specify the type of safety equipment and procedures for Site remediation/excavation.	Potential ARAR for workers and the workplace throughout the implementation of hazardous activities.
OSHA	29 CFR 1904	Outlines recordkeeping and reporting requirements.	Potential ARAR for all contractors/subcontractors involved in hazardous activities.
USEPA-Administered Permit Program: The Hazardous Waste Permit Program	RCRA Section 3005, 40 CFR Part 270.124	Covers the basic permitting, application, monitoring, and reporting requirements for off-site hazardous waste management facilities.	Any off-Site facility accepting hazardous waste from the Site must be properly permitted. Implementation of the Site remedy will include consideration of these requirements.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
National Pollutant Discharge Elimination System (NPDES) Program, Administered Under New York State Pollution Discharge Elimination System (SPDES)	40 CFR Parts 122 Subpart B, 125, 301, 303, and 307; (Administered Under 6 NYCRR 750-758)	Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters including the quantity and quality of discharge.	Potentially applicable to remedial activities that involve treatment/ disposal of water including injection of treatment materials into the aquifer. While NYSDEC SPDES permits are not required for Superfund actions, the actions must comply with the substantive requirements of the regulations.
General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001)	Article 17, Titles 7, 8 and Article 70 of New York Environmental Conservation Law	Before commencing construction activity, the owner or operator of a construction project that will involve soil disturbance of one or more acres must obtain coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity.	Potentially applicable to remedial actions (e.g., construction of a slurry wall) that may result in a disturbance of greater than one acre.
Not Applicable	NYSDEC's Monitoring Well Decommissioning Guidelines (NPL Site Monitoring Well Decommissioning dated May 1995)	This guidance presents procedure for decommissioning monitoring wells at remediation sites.	This guidance will be considered if decommissioning of monitoring wells is required as part of remedial activities.
New York Air Quality Classification System	6 NYCRR Part 256	Outlines the air quality classifications for different land uses and population densities.	The air quality classification system will be considered during the treatment process design, if applicable.
New York Permits and Certificates	6 NYCRR Part 201	Provides instructions and regulations for obtaining a permit to operate an air emission source. Also provides instructions on what to do in case of malfunction.	While permits are not required for Superfund remedial actions, the actions must meet the substantive requirements of the applicable regulations.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
New York Emissions Testing, Sampling, and Analytical Determinations	6 NYCRR Part 202	Outlines requirements for emissions testing for air emission sources. States that independent emissions testing can be ordered by the Commissioner of the NYSDEC.	Potentially applicable to remedial systems as emissions from treatment procedure must be analyzed.
New York Regulations for General Process Emissions	6 NYCRR Part 212	Outlines the procedure of environmental rating. The Commissioner of the NYSDEC determines a rating of emissions based on sampling.	The Commissioner of the NYSDEC will issue an environmental rating for emissions based on this regulation.
New York Air Quality Standards	6 NYCRR Part 257	Provides air quality standards for different chemicals, particles, and processes	Potentially applicable to remedial systems and emissions.
Not Applicable	DAR-1 (Air Guide 1)	Provides guidance for the control of toxic ambient air contaminants in New York State and outlines the procedures for evaluating sources of air pollution.	This guidance may be considered for remedial alternatives that result in certain air emissions.
New York Uniform Procedures	6 NYCRR Part 621	Facilities that emit contaminants to the air in New York State, unless specifically exempted, are required to obtain a Title V permit, a state facility permit, or a registration certificate. The Department's permit application processing procedures are found in 6 NYCRR Part 621.	While permits are not required for Superfund actions, the substantive requirements of these regulations could apply.
New York Hazardous Waste Management System - General	6 NYCRR Part 370	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management regulations.	Potentially applicable where hazardous waste is to be managed.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	Outlines criteria for determining if a solid waste is a hazardous waste subject to regulation under 6 NYCRR Parts 370 through 376.	Potentially applicable for determining if solid waste generated during implementation of remedial activities are hazardous wastes.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	6 NYCRR Part 372	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters, and facilities in New York State.	Potentially applicable to the treatment, transport or management of hazardous material generated at the Site.
New York Regulations for Transportation of Hazardous Waste	6 NYCRR Part 372.3 a-d	Outlines procedures for the packaging, labeling, manifesting, and transporting of hazardous waste.	Potentially applicable to the transport of hazardous material from the Site.
Waste Transporter Permits	6 NYCRR Part 364	Governs the collection, transport, and delivery of regulated waste within New York State.	Potentially applicable to the transport of hazardous material from the Site.
Not Applicable	NYSDEC Technical and Administrative Guidance Memorandums (TAGMs)	TAGMs are NYSDEC guidance that are to be considered during the remedial process.	Appropriate TAGMs will be considered during the remedial process.
New York Regulations for Hazardous Waste Management Facilities	6 NYCRR Part 373.1.1-373.1.8	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage, and disposal facility. Also lists contents and conditions of permits.	Potentially applicable to any off-site facility accepting waste from the Site. New York defers to USEPA for UTS/LDR regulations.
New York Regulations for Environmental Remedial Programs	6 NYCRR Part 375	Provides remediation requirements for inactive hazardous waste disposal sites.	Applicable to remedial actions implemented at the site.
Land Disposal of a Hazardous Waste	6 NYCRR Part 376	Restricts land disposal of hazardous wastes that exceed specific criteria.	New York defers to USEPA for UTS/LDR regulations.
Not Applicable	NYSDEC Division of Environmental Remediation (DER) Numbered Technical Guidance Series Documents: DER-10	DER-10 provides guidance on NYSDEC-accepted site investigation and remediation processes. NYSDEC Commissioner's Soil Clean-up Guidance Policy: Provides a uniform process for the evaluation and cleanup of contaminated soil.	Guidance may be considered during implementation of remedial activities.

TABLE 4
PRELIMINARY IDENTIFICATION OF ACTION-SPECIFIC ARARs AND TBCs
Former Mattiace Petrochemical Facility
Glen Cove, New York

REGULATION	CITATION	SYNOPSIS	APPLICABILITY TO SITE CONDITIONS
Chemical Bulk Storage Tanks	6NYCRR Parts 595-599	State regulations for bulk storage (>185 gallons in above ground tank) of hazardous substance or mixture. Includes requirements for release reporting, response and corrective action.	Potentially applicable to bulk storage of wastewater treatment chemicals in aboveground storage tanks.
Spill Prevention Report (SPR)	6NYCRR 598.1(k)	State requirements for preparation of a spill prevention report when required under the Chemical Bulk Storage (CBS) regulations.	Potentially applicable if chemical bulk storage tanks greater than 185 gallons are present.
Long Island Wells Permit	6NYCRR Part 602	Requires a permit to install or operate any well in Nassau County to withdraw water for any purpose, when the total capacity of such wells is in excess of 45 gallons per minute.	Potentially applicable to groundwater withdrawals in excess of 45 gallons per minute.
Nassau County Public Health Ordinance: Toxic and Hazardous Materials, Storage, Handling, and Control	Article XI	Local regulations detailing the storage, handling and control of hazardous materials.	Potentially applicable where hazardous waste is stored, handled, and/or controlled. Covers tank design standards, secondary containment, labeling, spill and overfill protection, and inspection and monitoring.

ALTERNATIVE 5.5b
BIOREMEDIATION OF LNAPL AND GROUNDWATER, IN-SITU THERMAL TREATMENT OF SOIL AND
GROUNDWATER HOT SPOTS, PARTIAL VERTICAL CONTAINMENT, AND HYDRAULIC CONTROL
Former Mattiace Petrochemical Facility
Glen Cove, New York

Item	Quantity	Units	Unit Cost	Yrs - Future Costs	Present Value
CAPITAL COST - DIRECT					
Bioventing System					
Mobe/Demobe/General Conditions (Equipment, Materials, Personnel)	1	l.s.	\$28,000.00		\$28,000
Site Preparations (Clearing & Grubbing, Sed & Erosion, Utility Loc., Temp. Facilities, etc.)	1	l.s.	\$20,000.00		\$20,000
Geoprobings/Sampling for Geological Assessment	1	l.s.	\$30,000.00		\$30,000
New Sch 40 PVC Horizontal Extraction Wells (drill, grout, install)	1,515	lf	\$220.00		\$333,300
New 4" Sch 40 PVC Bioventing/Injection Wells (drill, grout, install)	1,200	lf	\$201.67		\$242,009
Bioventing Well Roadboxes	20	ea	\$300.00		\$6,000
New 4" HDPE SVE Piping (Trench, Install, Backfill)	150	lf	\$43.36		\$6,504
Disposal of contam. cuttings/spoils (char./disposal)	5	tons	\$100.00		\$510
New 60 HP SVE Blower Systems	2	ea	\$60,502.28		\$121,005
Actuating Valves	9	ea	\$1,500.00		\$13,500
Vapor Phase GAC Vessels (72 cu ft.)	12	ea	\$6,222.32		\$74,668
Vapor Phase KMnO4-Al Vessels (36 cu ft.)	4	ea	\$4,977.86		\$19,911
Misc. Piping and Mechanical Reconfigurations (at Treatment Compound)	1	l.s.	\$20,000.00		\$20,000
Electrical Subcontractor (Equipment and Labor)	1	l.s.	\$50,000.00		\$50,000
Controls System Subcontractor (Equipment and Labor)	1	l.s.	\$40,000.00		\$40,000
TRC Oversight (Field)	2,800	hr	\$100.00		\$280,000
TRC Oversight (Project Management)	280	hr	\$220.00		\$61,600
Checkout Engineer	20	hr	\$120.00		\$2,400
Site Restoration (Paving, Turf, Landscaping, etc.)	1	l.s.	\$25,000.00		\$25,000

ALTERNATIVE 5.5b
BIOREMEDIATION OF LNAPL AND GROUNDWATER, IN-SITU THERMAL TREATMENT OF SOIL AND
GROUNDWATER HOT SPOTS, PARTIAL VERTICAL CONTAINMENT, AND HYDRAULIC CONTROL
Former Mattiace Petrochemical Facility
Glen Cove, New York

Item	Quantity	Units	Unit Cost	Yrs - Future Costs	Present Value
Electric Resistance Heating System					
Mobe/Demobe/General Conditions (Equipment, Materials, Personnel)	1	ls.	\$792,000.00		\$792,000
Site Preparations (Clearing & Grubbing, Sed & Erosion, Utility Loc., Temp. Facilities, etc.)	1	ls.	\$473,000.00		\$473,000
Geoprobng/Sampling for Geological Assessment	1	ls.	\$22,000.00		\$22,000
New 4" Electric Resistnace Heating Probes (drill, grout, install)	3,200	lf	\$100.00		\$320,000
New 4" Sch 40 PVC SVE Wells (drill, grout, install)	3,200	lf	\$100.00		\$320,000
Abandonment of Existing 2" PVC Monitoring Wells (drill, grout, install)	900	lf	\$27.50		\$24,750
Install 2" Confirmatory Groundwater Monitoring Wells	125	lf	\$126.05		\$15,756
Develop Groundwater Monitoring Wells	2	days	\$3,529.30		\$7,059
Disposal of contam. cuttings/spoils (char./disposal)	29	tons	\$100.00		\$2,938
Misc. Piping and Mechanical Reconfigurations (at Treatment Compound)	1	ls.	\$440,000.00		\$440,000
Electrical Subcontractor (Equipment and Labor)	1	ls.	\$88,000.00		\$88,000
Controls System Subcontractor (Equipment and Labor)	1	ls.	\$165,000.00		\$165,000
TRC Oversight (Field)	1,250	hr	\$100.00		\$125,000
TRC Oversight (Project Management)	650	hr	\$220.00		\$143,000
Checkout Engineer	100	hr	\$120.00		\$12,000
Site Restoration (Paving, Turf, Landscaping, etc.)	1	ls.	\$30,000.00		\$30,000
Containment Systems					
Mobe/Demobe/General Conditions (Equipment, Materials, Personnel)	1	ls	\$10,000.00		\$10,000
Site Preparations (Sed & Erosion, Work Surface Grading, Pavement Demo/T&D, Utility Loc., Temp. Facilities, etc.)	1	ls	\$10,000.00		\$10,000
Geoprobng/Sampling Along Proposed Slurry Wall Route	1	ls	\$10,000.00		\$10,000
Construct Mixing Basin Containment Berms	1	ls	\$10,000.00		\$10,000
Slurry Wall Excavation, up to 25' Deep	333	cy	\$4.34		\$1,446
Slurry Wall Excavation, 25' to 50' Deep	444	cy	\$9.41		\$4,183
Bentonite Material for Slurry	205	tons	\$81.70		\$16,728
Clean Low Permeability Fill from Offsite (materials only)	583	tons	\$10.00		\$5,833
Slurry Mixing, Hydration, Placement	17,044	gals	\$0.12		\$2,046

ALTERNATIVE 5.5b
BIOREMEDIATION OF LNAPL AND GROUNDWATER, IN-SITU THERMAL TREATMENT OF SOIL AND
GROUNDWATER HOT SPOTS, PARTIAL VERTICAL CONTAINMENT, AND HYDRAULIC CONTROL
Former Mattiace Petrochemical Facility
Glen Cove, New York

Item	Quantity	Units	Unit Cost	Yrs - Future Costs	Present Value
Soil-Bentonite Backfill Mixing	778	cy	\$4.59		\$3,573
Backfill Slurry Wall Trench (labor and equipment)	778	cy	\$10.00		\$7,778
Management and Offsite Disposal, Unsuitable Soil	583	tons	\$100.00		\$58,333
Management, Contam. Fluids	1	ls	\$15,000.00		\$15,000
Steel Sheet Piling, Driven	7,650	sf	\$35.00		\$267,750
Site Restoration (Trench Capping, Turf, Landscaping, etc.)	1	ls	\$20,000.00		\$20,000
TRC Oversight (Field)	500	hr	\$100.00		\$50,000
TRC Oversight (Project Management)	50	hr	\$220.00		\$11,000
Checkout Engineer	20	hr	\$120.00		\$2,400
Phytoremediation System					
Install Treewell Boreholes	1,125	lf	\$52.88		\$59,488
Furnish and Install Treewell (Excluding Trees)	1,125	ls	\$15.86		\$17,846
Furnish and Install Trees in Treewell	75	ea	\$26.44		\$1,983
Disposal of contam. cuttings/spoils (char./disposal)	200	tons	\$100.00		\$20,000
TRC Oversight (Field)	600	hr	\$100.00		\$60,000
TRC Oversight (Project Management)	60	hr	\$220.00		\$13,200
Checkout Engineer	10	hr	\$120.00		\$1,200
Total Direct Costs					\$5,034,698
CAPITAL COST - INDIRECT					
Engineering and Design (10%)					\$503,470
Legal and Administrative (5%)					\$251,735
Permits and Plans (5%)					\$251,735
TOTAL CAPITAL COSTS					\$6,041,638

ALTERNATIVE 5.5b
BIOREMEDIATION OF LNAPL AND GROUNDWATER, IN-SITU THERMAL TREATMENT OF SOIL AND
GROUNDWATER HOT SPOTS, PARTIAL VERTICAL CONTAINMENT, AND HYDRAULIC CONTROL
Former Mattiace Petrochemical Facility
Glen Cove, New York

Item	Quantity	Units	Unit Cost	Yrs - Future Costs	Present Value
FUTURE ACTIONS					
Effectiveness/Environmental Monitoring					
Annual Ground Water Sampling/Reporting (Initial)	1	l.s.	\$10,000.00	1	\$10,000
Annual Ground Water Sampling/Reporting (Year 2 through 5)	1	l.s.	\$7,500.00	4	\$23,772
Annual Ground Water Sampling/Reporting (Year 6 through 20)	1	l.s.	\$6,000.00	15	\$38,809
Soil Gas Monitoring	1	l.s.	\$15,000.00	5	\$61,500
Five Year Reviews (\$30,000 each, annualized basis)	1	l.s.	\$5,217.00	20	\$55,248
Bioventing System O+M					
Air Effluent Treatment (First Year)	1	l.s.	\$165,012.50	1	\$165,013
Air Effluent Treatment (Years 2 through 5)	1	l.s.	\$66,005.00	4	\$209,213
Additional System O&M (Labor and Sampling)	1	l.s.	\$75,000.00	5	\$307,500
Bioamendment Application - Substrate (Years 2, 4, 7)	350,000	lb	\$0.85	3	\$672,053
Bioamendment Application - Substrate Injection (via wells only) (Years 2, 4 and 7)	20	points	\$10,370.53	3	\$468,541
Bioamendment Application - TRC Oversight (Field & Project Mgmt) (Years 2, 4 and 7)	12	weeks	\$6,100.00	3	\$165,359

ALTERNATIVE 5.5b
BIOREMEDIATION OF LNAPL AND GROUNDWATER, IN-SITU THERMAL TREATMENT OF SOIL AND
GROUNDWATER HOT SPOTS, PARTIAL VERTICAL CONTAINMENT, AND HYDRAULIC CONTROL
Former Mattiace Petrochemical Facility
Glen Cove, New York

Item	Quantity	Units	Unit Cost	Yrs - Future Costs	Present Value
Electrical Resistance Heating System O+M					
Air Effluent Treatment	1	l.s.	\$100,000.00	1	\$100,000
Electrical Energy Consumption	2,400,000	kWh	\$0.21	1	\$504,000
Subcontractor O&M	1	l.s.	\$473,000.00	1	\$473,000
Additional System O&M (Labor and Sampling)	1	l.s.	\$75,000.00	1	\$75,000
TOTAL NET PRESENT VALUE OF O & M					\$3,329,006
CONTINGENCY (20%)					\$1,874,129
TOTAL PRESENT VALUE COST FOR ALTERNATIVE 5b					\$11,244,773

APPENDIX III

Administrative Record Index

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL
04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.
CERCLIS ID: NYD000512459
OUID: 01
SSID: 022B
Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
196659	04/14/2014	COMPREHENSIVE ADMINISTRATIVE RECORD INDEX FOR OU1 FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	10	[INDEX]			[]	[]	[.]	[US ENVIRONMENTAL PROTECTION AGENCY]
38982	01/01/1111	MATTIACE PETROCHEMICAL COMPANY SITE, OPERABLE UNIT ONE, ADMINISTRATIVE RECORD, INDEX OF DOCUMENTS.	12	[INDEX]			[]	[]	[.]	[US ENVIRONMENTAL PROTECTION AGENCY]
101554	01/01/1111	MATTIACE PETROCHEMICAL CO., INC., OPERABLE UNIT 1, ADMINISTRATIVE RECORD UPDATE. INDEX OF DOCUMENTS.	1	[INDEX]			[]	[]	[.]	[US ENVIRONMENTAL PROTECTION AGENCY]
182605	01/29/1991	Letter to Honorable Donald P. De Rigg, Mayor & Supervisor of Glen Cove, New York from Mr. Edvard G. Als, RPM, US EPA, Re: Placement of the Li Tungsten site on EPA's NPL of Superfund sites. January 29 1991	1	[LETTER]	1	1	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[ALS, EDWARD]	[EPA, REGION 2]
182606	12/29/1988	Letter to US EPA from Honorable Alfonse M. D'Amato, US Senator, Re: Response to Correspondence. December 29 1988	1	[LETTER]	2	2	[.]	[US ENVIRONMENTAL PROTECTION AGENCY]	[D'AMATO, ALFONSE M]	[UNITED STATES SENATE]
182607	11/14/1988	Letter to Honorable Alfonse M. D'Amato, US Senator, from Honorable Donald P. De Rigg, Mayor & Supervisor of Glen Cove, New York, Re: Assistance of EPA to evaluate Glen Cove. November 14 1988	1	[LETTER]	3	3	[D'AMATO, ALFONSE M]	[UNITED STATES SENATE]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182608	05/03/1988	Letter to Honorable Donald P. De Rigg, Mayor and Supervisor of Glen Cove, New York from Mr. Stephen D. Luftig, Director of Emergency & Remedial Response Division. Re: Hazardous waste site at Garvies Point Road Glen Cove New York May 3 1988	2	[LETTER]	4	5	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[LUFTIG, STEPHEN]	[US ENVIRONMENTAL PROTECTION AGENCY]
182609	03/21/1988	Letter to Regional Administrator, US EPA, from Honorable Donald P. De Rigg, Mayor & Supervisor of Glen Cove, New York. Re: Superfund - Garvies Point Road, Glen Cove. March 21 1988	1	[LETTER]	6	6	[.]	[US ENVIRONMENTAL PROTECTION AGENCY REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182610	05/27/1988	Pollution Report: Incident/Site No.: 2B Mattiace Petrochemical, from Mr. Dwayne M. Harrington, On-Scene Coordinator, Response & Prevention Branch, US EPA. May 27 1988	2	[REPORT]	7	8	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , SPRAGUE, BRUCE]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]
182611	05/18/1988	Pollution Report: Incident/Site No.: 2B Mattiace Petrochemical, from Mr. Dwayne M. Harrington, On-Scene Coordinator, Response & Prevention Branch, US EPA. May 18 1988	2	[REPORT]	9	10	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , SPRAGUE, BRUCE]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]
182612	04/29/1988	Pollution Report: Incident/Site No.: 2B Mattiace Petrochemical, from Mr. Dwayne M. Harrington, On-Scene Coordinator, Response & Prevention Branch, US EPA. April 29 1988	3	[REPORT]	11	13	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , SPRAGUE, BRUCE]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182613	03/22/1988	Pollution Report: Incident/Site No.: 2B Mattiace Petrochemical, from Mr. Dwayne M. Harrington, On-Scene Coordinator, Response & Prevention Branch, US EPA. March 22 1988	4	[REPORT]	14	17	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , SPRAGUE, BRUCE]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]
182614	02/08/1988	Pollution Report: Incident/Site No.: 2B Mattiace Petrochemical, from Mr. Dwayne M. Harrington, On-Scene Coordinator, Response & Prevention Branch, US EPA. February 8 1988	2	[REPORT]	18	19	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , ZACHOS, GEORGE]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]
182615	07/08/1987	Pollution Report: Incident/Site No.: Applied Environmental Services, Inc., .from Mr. Christopher A. Militscher, On-Scene Coordinator, Response & Prevention Branch, US EPA. July 8 1987	2	[REPORT]	20	21	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , SALKIE, RICHARD]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[MILITSCHER, CHRIS]	[EPA]
182616	04/22/1987	Pollution Report: Incident/Site No.: Mattiace Petrochemical Company from Mr. Christopher A. Militscher, On-Scene Coordinator, Response & Prevention Branch, US EPA. April 22 1987	3	[REPORT]	22	24	[DAGGETT, CHRISTOPHER J, LUFTIG, STEPHEN , RUBEL, FRED H]	[EPA, US ENVIRONMENTAL PROTECTION AGENCY]	[MILITSCHER, CHRIS]	[EPA]
182617	02/12/1990	Arcs II Quality Assurance Plan, Assignment No.006-2L2B, Mattiace, FCR #15 to Mr. Dana Boyadjian, Site Manager, Edison/ New Jersey, from Ebasco Services Inc. Feb. 9, 1990 Revised February 12 1990	1	[FORM]	25	25	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182618	01/26/1990	Arcs II Quality Assurance Plan, Assignment #006-212B, Mattiace, FCR #13 to Mr. Dana Boyadjian, Site Manager, Ebasco Services Inc. January 26 1990	1	[FORM]	26	26	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182619	01/26/1990	Arcs II Quality Assurance Plan, FCR #14 to Mr. Dana Boyadjian, Ebasco Services Inc. January 26 1990	1	[FORM]	27	27	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182620	12/13/1989	Arcs II Quality Assurance Plan, Assignment #006-2L2B, Mattiace, FCR #12 to Mr. Dana Boyadjian, Ebasco Services Inc. December 13 1989	1	[FORM]	28	28	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182621	12/13/1989	Arcs II Quality Assurance Plan, Assignment #006-2L2B, Mattiace, FCR #11 to Mr. Dana Boyadjian, Ebasco Services Inc. December 13 1989	1	[FORM]	29	29	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182622	12/13/1989	Arcs II Quality Assurance Plan, Assignment #006-2L2B, Mattiace, FCR #10 to Mr. Dana Boyadjian, Ebasco Services Inc. December 13 1989	1	[FORM]	30	30	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]	[.]	[EBASCO SERVICES INC]
182623	11/17/1989	Field Change Request, EPA Work Assignment No. 006-2L2B, FC #8, to Mr. Dana Boyadjian, IT Corp., Edison, New Jersey. November 17 1989	1	[FORM]	31	31	[BOYADJIAN, DANA]	[ITC]	[.]	[EBASCO SERVICES INC]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182624	11/17/1989	Field Change Request, EPA Work Assignment No. 006-2L2B, FC #7, to Mr. Dana Boyadjian, IT Corp., Edison, New Jersey. November 17 1989	1	[FORM]	32	32	[BOYADJIAN, DANA]	[ITC]	[.]	[EBASCO SERVICES INC]
182625	02/23/1989	Letter to Mr. Edward G. Als, US EPA from Mr. Robert Wither, Project Engineer, Bureau of Eastern Remedial Action. Re: Mattiace Petrochemical Site I.D. #130017. Comments on draft work plan. February 23 1989	2	[LETTER]	33	34	[ALS, EDWARD]	[EPA, REGION 2]	[WITHER, ROBERT]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
182626	01/30/1989	Letter to Mr. Edward G. Als, US EPA from Mr. Robert Wither, Project Engineer, Bureau of Eastern Remedial Action. Re: Mattiace Petrochemical Site I.D. #130017. Comments on draft work plan. January 30 1989	5	[LETTER]	35	39	[ALS, EDWARD]	[EPA, REGION 2]	[WITHER, ROBERT]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
182627	04/01/1991	Report: Final Remedial Investigation Report, Mattiace Petrochemical Site. Operable Unit One, Glen Cove. New York. Volume I of II. Prepared by EBASCO Services Inc. April 1991	539	[REPORT]	40	578	[]	[]	[.]	[EBASCO SERVICES INC]
182628	04/01/1991	Report: Final Remedial Investigation Report Mattiace Petrochemical Site. Operable Unit One, Glen Cove. New York. Volume II of II. Prepared by EBASCO Services Inc. April 1991	657	[REPORT]	579	1233	[]	[]	[.]	[EBASCO SERVICES INC]
182629	02/01/1991	Letter to Mr. Edward Als, US EPA from Mr. James J. Bologna, Bureau of Eastern Remedial Action/ NY State Department of Environmental Conservation, Re: Comments on Draft Remedial Investigation Report, Mattiace Petrochemical Site ID No.130017...	4	[LETTER]	1234	1237	[ALS, EDWARD]	[EPA, REGION 2]	[BOLOGNA, JAMES J]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION]
182630	10/25/1990	Letter to Ms. Jill Hacker, Project Officer, US EPA and Mr. Edward Als, US EPA, from Mr. Mario Verdibello, PE. Re: Arcs II Program - EPA Contract No.68-W8-0110, Work Assignment No. 006-2L2B. Mattiace Petrochemical Data Evaluation...	2	[LETTER]	1238	1239	[HACKER, JILL]	[EPA, REGION 2]	[VERDIBELLO, MARIO]	[EBASCO SERVICES INC]
182631	10/25/1990	Memorandum to file Re: Mattiace Petrochemical Co., Inc. Retaining Wall Collapse. October 25 1990	4	[MEMORANDUM]	1240	1243	[]	[]	[]	[]
182632	10/10/1990	Memorandum to Directors of Waste Management Div., Directors of Emergency & Remedial Response Div. Directors of Hazardous Waste Management Division, and Regional Counselors from Mr. Henry L. Longest. II, Director Office of Emergency and Remedial	13	[MEMORANDUM]	1244	1256	[]	[]	[LONGEST, HENRY L]	[EPA]
182633	07/27/1990	Letter to Honorable Donald P. De Riggi, Mayor of Glen Cove, New York from Mr. Edward Als, US EPA. Re: Status of work being performed by EPA at the Mattiace Superfund site on Garvey's Point Road. July 27 1990	2	[LETTER]	1257	1258	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[ALS, EDWARD]	[EPA, REGION 2]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182634	07/25/1990	Letter to Honorable Donald P. De Riggi, Mayor of Glen Cove, New York from Mr. Constantine Sideamon-Eristoff, Regional Administrator, US EPA. Re: Sites (Li Tungsten, Mattiace, Garvies Pt.) along Glen Cove Creek which contain hazardous materials	2	[LETTER]	1259	1260	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[SIDAMON-ERISTOFF, CONSTANTINE]	[EPA, REGION 2]
182635	07/23/1990	Letter to Mr. Edward Als, RPM, US EPA from Honorable Donald P. De Riggi, Mayor of Glen Cove, New York, Re: Mattiace-Edmos status update. July 23 1990	1	[LETTER]	1261	1261	[ALS, EDWARD]	[EPA, REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182636	07/05/1990	Letter to Ms. Lillian Johnson, Chief, Superfund Community Relations, US EPA from Mr. Sydne B. Marshall, Ph.D, Ebasco Environmental. Re: Mattiace Petrochemical Site, Glen Cove, New York. Additions to the Mailing List July 5 1990	1	[LETTER]	1262	1262	[JOHNSON, LILLIAN]	[EPA]	[MARSHALL, SYDNE B]	[EBASCO SERVICES INC]
182637	06/29/1990	Letter to Mr. Dana Boyadjian, Project Manager, IT Corporation from Mr. Edward G. Als, US EPA, Re: Mattiace Petrochemical Superfund Site-Offsite Groundwater characterization June 29 1990	2	[LETTER]	1263	1264	[BOYADJIAN, DANA]	[ITC]	[ALS, EDWARD]	[EPA, REGION 2]
182638	05/25/1990	Letter to Mr. Dana Boyadjian, Project Manager, IT Corporation from Mr. Edward G. Als, US EPA, Re: Revision of subtask 3I (Section 3.3.8) of workplan for Mattiace Petrochemical Superfund site (OU2) entitled Groundwater Monitoring May 25 1990	2	[LETTER]	1265	1266	[BOYADJIAN, DANA]	[ITC]	[ALS, EDWARD]	[EPA, REGION 2]
182639	02/15/1990	Letter to Mr. Mario Verdibello, Supervising Engineer, Ebasco Services Inc., from Mr. Edward G. Als, US EPA, Re: Recent field change request no.15 at the Mattiace Petrochemical Superfund site in Glen Cove, New York February 15 1990	1	[LETTER]	1267	1267	[VERDIBELLO, MARIO]	[EBASCO SERVICES INC]	[ALS, EDWARD]	[EPA, REGION 2]
182640	12/08/1989	Letter to Mr. Charles W. Bowman, Land Use Company from Mr. Robert N. Thurber, Sr. Environmental Analyst, NYSDEC. Re: Dredging of Bona Fide Industries Site. December 8 1989	3	[LETTER]	1268	1270	[BOWMAN, CHARLES W]	[LAND USE COMPANY]	[THURBER, ROBERT N]	[NYSDEC]
182641	12/04/1989	Letter to Mr. Edward Als, US EPA from Mr. Dana M. Boyadjian, Project Engineer, IT Corporation and Mr. Robert C. Landle, CPG, IT Corporation. Re: Mattiace Petrochemical Site relocation of two monitor wells. December 4 1989	2	[LETTER]	1271	1272	[ALS, EDWARD]	[EPA, REGION 2]	[BOYADJIAN, DANA , LANDLE, ROBERT C]	[IT CORPORATION, ITC]
182642	07/21/1989	Letter to Mr. Edward Als, US EPA from Ms. Debra L.Rothberg of Jones, Day, Reavis, & Pogue. Re: Permission for access: Li Tungsten Property. July 21 1989	2	[AGREEMENT]	1273	1274	[ALS, EDWARD]	[EPA, REGION 2]	[ROTHENBERG, DEBRA L]	[JONES DAY REAVIS & POGUE]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182643	06/15/1989	Memorandum to Regional Waste Management Division Directors, Regional Superfund Branch Chiefs, Regional Air Division Directors, Regional Air Branch Chiefs, OERR Division Directors, OAQPS Division Directors from Henry L. Longest II, Director	5	[MEMORANDUM]	1275	1279	[,]	[ADDRESSEES]	[LONGEST, HENRY L]	[EPA]
182644	06/09/1989	US EPA permission form for access to properties concerning the Mattiace Petrochemical Superfund Site RI/FS Investigations, Glen Cove, New York. June 9, 1989	1	[AGREEMENT]	1280	1280	[]	[]	[]	[]
182645	05/23/1989	US EPA permission form for access to properties concerning the Mattiace Petrochemical Superfund Site RI/FS Investigations, Glen Cove, New York. May 23 1989	1	[AGREEMENT]	1281	1281	[]	[]	[]	[]
182646	05/22/1989	US EPA permission form for access to properties concerning the Mattiace Petrochemical Superfund Site RI/FS Investigations, Glen Cove, New York. May 22 1989	1	[AGREEMENT]	1282	1282	[]	[]	[]	[]
182647	05/17/1989	Letter to Mr. Jan Burman, c/o Ms. Debra L. Rothberg, Beveridge and Diamond, PA, from Mr. Edward Als, US EPA. Re: US EPA conducting Remedial Investigation/Feasibility Study (RI/FS) Activities at the Mattiace Petrochemical Superfund Site in Glen Cove	2	[LETTER]	1283	1284	[BURMAN , JAN , ROTHENBERG, DEBRA L]	[JONES DAY REAVIS & POGUE, NONE]	[ALS, EDWARD]	[EPA, REGION 2]
182648	03/03/1989	Letter to Honorable Alfonse M. D'Amato, US Senator, from Mr. William J. Muszynski, P.E., Acting Regional Administrator US EPA. Re: Response to letter written on behalf of the Mayor of City of Glen Cove, Honorable Donald DeRiggi. March 3 1989	1	[LETTER]	1285	1285	[D AMATO, ALFONSE M]	[US CONGRESS]	[MUSZYNSKI, WILLIAM J]	[EPA]
182649	02/21/1989	Letter to Honorable Donald P. De Riggi, Mayor & Supervisor, Glen Cove, New York from Mr. William J. Muszynski, Acting Regional Administrator US EPA. Re: Response letter concerning Glen Cove Creek. February 21 1989	2	[LETTER]	1286	1287	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[MUSZYNSKI, WILLIAM J]	[EPA]
182650	01/31/1989	Letter to Honorable Alfonse M. D'Amato, US Senator, from Honorable Donald P. De Riggi, Mayor, Glen Cove, New York. Re: Six sites containing various degrees of soil contamination at Glen Cove Creek. January 31 1989	3	[LETTER]	1288	1290	[D AMATO, ALFONSE M]	[US CONGRESS]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182651	01/26/1989	Letter to Honorable Alfonse M. D'Amato, US Senator, from Mr. William J. Muszynski, P.E., Acting Regional Administrator US EPA. Re: Properties owned by Old Bank of Maryland which exhibit various degrees of soil contamination. January 26 1989	3	[LETTER]	1291	1293	[D AMATO, ALFONSE M]	[US CONGRESS]	[MUSZYNSKI, WILLIAM J]	[EPA]
182652	01/26/1989	Letter to Mr. Edward Als, US EPA from Honorable Donald P. De Riggi, Mayor, Glen Cove, New York. Re: Inspection of Glen Cove Creek. January 26 1989	1	[LETTER]	1294	1294	[ALS, EDWARD]	[EPA, REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182653	01/20/1989	Letter to Mr. William J. Muszynski, Acting Regional Administrator, EPA from Honorable Donald P. De Riggi, Mayor & Supervisor, Glen Cove, New York. Re: EPA to do Work at Mattiace with an examination of the entire creek area be examined for remedial work...	2	[LETTER]	1295	1296	[MUSZYNSKI, WILLIAM J]	[EPA]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182654	01/20/1989	Letter to Mr. William J. Muszynski, Acting Regional Administrator, EPA from Honorable Donald P. De Riggi, Mayor & Supervisor, Glen Cove, New York. Re: Discovery of arsenic plume at the easterly end of Glen Cove Creek in the Charles Street vicinity	1	[LETTER]	1297	1297	[MUSZYNSKI, WILLIAM J]	[EPA]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
182655	01/06/1989	Letter to Mr. Edward G. Als, US EPA, from Mr. Robert Wither, Project Engineer, Bureau of Eastern Remedial Action, NY State Department of Environmental Conservation. Re: Mattiace Petrochemical Site work plan. January 6 1989	1	[LETTER]	1298	1298	[ALS, EDWARD]	[EPA, REGION 2]	[WITHER, ROBERT]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
182656	01/03/1989	Letter to Mr. Robert Foltin, Chief, Eastern Remedial Hazardous Waste Section, NY State Department of Environmental Conservation, from Mr. Edward G. Als, US EPA. Re: Draft workplan for the Mattiace Petrochemical Co. Superfund site in Glen Cove	1	[LETTER]	1299	1299	[FOLTIN, ROBERT]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[ALS, EDWARD]	[EPA, REGION 2]
182657	03/13/1991	Letter to Mr. Edward G. Als, US EPA, from Mr. James J. Bologna, Bureau of Eastern Remedial Action, NY State Department of Environmental Conservation. Re: Draft Feasibility Study Report, Mattiace Petrochemical Site-EPA ID#130017. March 13 1991	3	[LETTER]	1300	1302	[ALS, EDWARD]	[EPA, REGION 2]	[BOLOGNA, JAMES J]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION]
182658	09/22/1988	Letter to Mr. Stephen D. Luftig, US EPA-Region II from Mr. James P. Cowan, State Clearinghouse, NY State Division of the Budget. Re: Federal Funding Application - Mattiace Petrochemical, Inc., Nassau Co. September 22 1988	1	[LETTER]	1303	1303	[LUFTIG, STEPHEN D]	[EPA]	[COWAN, JAMES P]	[NY STATE CLEARINGHOUSE]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
182659	09/01/1988	Project Notification & Review System, Applicant: US EPA Project Title: Mattiace Petrochemical Company Inc. Superfund (RI/FS) Site. Signed by Susan D. Windesheim, Clearinghouse Administrator, Long Island Regional Planning Board. September 1 1988	1	[FORM]	1304	1304	[]	[]	[WINDESHEIM, SUSAN D]	[NY STATE CLEARINGHOUSE]
191300	09/01/1988	Project Notification & Review System, Applicant: US EPA Project Title: Mattiace Petrochemical Company Inc. Superfund (RI/FS) Site. September 1 1988	1	[FORM]	1305	1305	[]	[]	[]	[]
191301	09/01/1988	Project Notification & Review System, Applicant: US EPA Project Title: Mattiace Petrochemical Company Inc. Superfund (RI/FS) Site. September 1 1988	1	[FORM]	1306	1306	[]	[]	[LIBERT, HERBERT]	[NONE]
191302	08/18/1988	Letter to Mr. James Cowan, NY State Clearinghouse from Mr. Stephen D. Luftig, Director Emergency & Remedial Response Division, US EPA. Re: Mattiace Petrochemical Company, Inc. Superfund Site Notification of proposed Superfund project.	3	[LETTER]	1307	1309	[COWAN, JAMES P]	[NY STATE CLEARINGHOUSE]	[LUFTIG, STEPHEN D]	[EPA]
191303	08/17/1988	Letter to Department of State, Uniform Commercial Code Division from Mr. James F. Doyle, Assistant Regional Counsel, US EPA. Re: Notice of "Federal Lien" on property belonging to Mattiace Industries, Inc. August 17 1988	3	[LETTER]	1310	1312	[,]	[DEPARTMENT OF STATE]	[DOYLE, JAMES]	[EPA, REGION 2]
191304	02/04/1988	Letter to Mr. Stephen Luftig, Director Emergency & Remedial Response Division, US EPA from Mr. Michael J. O'Toole, Jr. P.E., Acting Director, NY State Department of Environmental Conservation. Re: Request for US EPA SARA Removal Action	2	[LETTER]	1313	1314	[LUFTIG, STEPHEN D]	[EPA]	[O TOOLE, MICHAEL JR J]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
191305	07/08/1988	Letter to Mr. William J. Mattiace, Mr. Otto P. Mattiace, and Mr. Louis J. Mattiace from Mr. Stephen D. Luftig, Director Emergency & Remedial Response Division, US EPA. Re: Notice letter pursuant to Section 107(a) and Section 104(b) of CERCLA	3	[LETTER]	1315	1317	[MATTIACE, LOUIS J, MATTIACE, OTTO P, MATTIACE, WILLIAM J]	[MATTIACE PETROCHEMICAL COMPANY, NONE]	[LUFTIG, STEPHEN D]	[EPA]
191306	03/30/1988	Letter to Mr. Louis J. Mattiace, Mattiace Petrochemical Company from Mr. Stephen D. Luftig, Director Emergency & Remedial Response Division, US EPA. Re: Mattiace Petrochemical Company, Removal Action Pursuant to CERCLA 42 U.S.C. March 30, 1988	2	[LETTER]	1318	1319	[MATTIACE, LOUIS J]	[MATTIACE PETROCHEMICAL COMPANY]	[LUFTIG, STEPHEN D]	[EPA]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
191307	03/30/1988	Letter to Mattiace Petrochemical Company, c/o Philip Tomich, Burruano & Tomich from Mr. Stephen D. Luftig, Director Emergency & Remedial Response Division. Re: Mattiace Petrochemical Company, Glen Cove, New York. Removal Action Pursuant to CERCLA...	2	[LETTER]	1320	1321	[,]	[MATTIACE PETROCHEMICAL COMPANY]	[LUFTIG, STEPHEN D]	[EPA]
191308	11/16/1990	Letter to Mr. William J. Mattiace, Mr. Otto P. Mattiace and Mr. Louis J. Mattiace from Mr. Richard L. Caspe, Project Engineer, Director, Emergency & Remedial Response Division, US EPA. Re: Mattiace Petrochemical Company Inc. Site	3	[LETTER]	1322	1324	[MATTIACE, LOUIS J, MATTIACE, OTTO P, MATTIACE, WILLIAM J]	[MATTIACE PETROCHEMICAL COMPANY, NONE]	[CASPE, RICHARD L]	[EPA]
191309	10/03/1990	Memorandum to Mr. Dwayne Harrington/ NYCRA, from Mr. Arthur Block, ATSDR Regional Representative, Dept. of Health and Human Services. Re: New York State Dept. of Health Review: Ref: Mattiace Petrochemical Record of Decision. October 3, 1990	1	[MEMORANDUM]	1325	1325	[HARRINGTON, DWAYNE M]	[EPA, REGION 2]	[BLOCK, ARTHUR]	[AGENCY FOR TOXIC SUBSTANCES AND DISEASES REGISTRY]
191310	08/30/1990	Letter to Honorable Donald P. DeRiggi, Mayor, Glen Cove, New York from Mr. Edward G. Als, US EPA. Re: Security at Mattiace Superfund site on Garvey's Point Road. August 30, 1990	2	[LETTER]	1326	1327	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[ALS, EDWARD]	[EPA, REGION 2]
191311	08/29/1990	Letter to Mr. Vincent Pitruzzello, US EPA-Region II, from Mr. Robert Pavia, Ph.D, US Department of Commerce. Re: NOAA's Preliminary Natural Resource Survey (PNRS) for the Mattiace Petrochemical Company, Inc. site (Site ID 2B) in Glen Cove, New York	11	[LETTER]	1328	1338	[PITRUZZELLO, VINCENT]	[EPA]	[PAVIA, ROBERT]	[US DEPT OF COMMERCE]
191312	10/03/1990	Letter to Mr. Vincent Pitruzzello, Chief Program Support Branch, Emergency & Remedial Response Division US EPA from Mr. Jonathan P. Deason, Director Office of Environmental Affairs, US Department of the Interior. Office of Secretary. Re: IAG	4	[LETTER]	1339	1342	[PITRUZZELLO, VINCENT]	[EPA]	[DEASON, JONATHAN]	[US DEPT OF INTERIOR]
191313	06/21/1989	Letter to Mr. Robert W. Hargrove, Chief Environmental Impacts Branch, US EPA from Mr. Clifford G. Day, Supervisor, US Department of the Interior, Fish & Wildlife Service. Re: Listing of endangered & threatened species in the vicinity of the Mattiace	7	[LETTER]	1343	1349	[HARGROVE, ROBERT W]	[EPA]	[DAY, CLIFFORD G]	[US FISH & WILDLIFE SERVICE]
191314	05/25/1987	Letter to Mr. Clifford G. Day, Field Supervisor, US Fish & Wildlife Service from Mr., Robert W. Hargrove, Chief Environmental Impacts Branch. Re: Consultation with the US Fish & Wildlife Service (F&WS) in the vicinity of the Mattiace Petrochemical	1	[LETTER]	1350	1350	[DAY, CLIFFORD G]	[US FISH & WILDLIFE SERVICE]	[HARGROVE, ROBERT W]	[EPA]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
191315	12/11/1989	Letter to Mr. Robert Dexter, E.V.S. Consultants, Inc. from Mr. Lawrence Tannenbaum, Technical & Pre-remedial Support Section, US EPA. Re: Documentation for Mattiace Petrochemical Site enabling the National Oceanic & Atmospheric Administration	1	[LETTER]	1351	1351	[DEXTER, ROBERT]	[E.V.S. CONSULTANTS, INC.]	[TANNENBAUM, LAWRENCE]	[EPA]
191316	01/09/1989	Letter to Ms. Lisa Peterson, Community Affairs Specialist US EPA from Mr. Sydne B. Marshall, Ph D. Community Affairs Specialist, Envirosphere Company. Re: ARCS II Community Relations Interview Schedule Mattiace Petrochemical Site. January 9, 1989	2	[LETTER]	1352	1353	[PETERSON, LISA]	[EPA]	[MARSHALL, SYDNE B]	[ENVIROSPHERE CO]
191317	11/17/1988	Letter to Mr. Edward Als, US EPA from Mr. Dana Boyadjian, Mattiace Petrochemical, EBASCO Services Inc., Re: ARCS II, EPA Contract No.68-W8-0110, W/A N0.006-2L2B, Mattiace Petrochemical RI/FS Community Relations. November 17 1988	2	[LETTER]	1354	1355	[ALS, EDWARD]	[EPA, REGION 2]	[BOYADJIAN, DANA]	[EBASCO SERVICES INC]
191318	08/02/1990	US EPA News, "EPA to Remove Drums from Mattiace Superfund Site in Glen Cove, Long Island." by Rich Cahill. August 2 1990	3	[FACTSHEET]	1356	1358	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
191319	02/14/1989	Letter to Honorable Donald P. De Riggi, Mayor, Glen Cove, New York from Mr. Edward Als, US EPA. Re: Informal informational meeting among DEC, EPA, Glen Cove Counsel and public. February 14, 1989	1	[LETTER]	1359	1359	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]	[ALS, EDWARD]	[EPA, REGION 2]
191320	02/10/1989	Letter to Mr. Edward Als, US EPA from Honorable Donald P. De Riggi, Mayor, Glen Cove, New York. Re: Meeting schedule regarding status of creek and environment. February 10 1989	1	[LETTER]	1360	1360	[ALS, EDWARD]	[EPA, REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
191321	01/20/1989	Letter to Mr. Edward Als, US EPA from Honorable Donald P. De Riggi, Mayor, Glen Cove, New York. Re: Informational meeting where DEC & EPA could relate to Glen Cove Council the problems along the Glen Cove Creek January 20 1989	1	[LETTER]	1361	1361	[ALS, EDWARD]	[EPA, REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
191322	01/12/1989	Letter to Mr. Edward Als, US EPA from Honorable Donald P. De Riggi, Mayor, Glen Cove, New York. Re: Copy of letter sent to DEC. January 12 1989	1	[LETTER]	1362	1362	[ALS, EDWARD]	[EPA, REGION 2]	[DE RIGGI, DONALD P]	[MAYOR OF GLEN COVE, NY]
99955	06/27/1991	Declaration for the Record of Decision, Mattiace Petrochemical Co., Inc., Glen Cove, Nassau County, New York, June 27, 1991. (Attachment: Decision Summary, Mattiace Petrochemical Co., Inc., Glen Cove, New York, prepared by US EPA, Region II, New York.)	101	[REPORT]	500001	500101	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

04/14/2014

REGION ID: 02

Site Name: MATTIACE PETROCHEMICAL CO., INC.

CERCLIS ID: NYD000512459

OUID: 01

SSID: 022B

Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
213205	06/01/2009	EFFECTIVENESS / ENVIRONMENTAL MONITORING DATA REPORT FOR 11/2008 - 12/2008 SAMPLING EVENT FOR OU3 AND OU4 FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	58	[REPORT]	R2-0000001	R2-0000058	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[TRC COMPANIES, INC., TRC ENGINEERS INCORPORATED]
213202	01/01/2010	DRAFT FOCUSED FEASIBILITY STUDY REPORT FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	99	[REPORT]	R2-0000059	R2-0000157	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[TRC ENGINEERS INCORPORATED]
213208	01/03/2011	US EPA COMMENTS ON THE FOCUSED FEASIBILITY STUDY REPORT FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	2	[LETTER]	R2-0000158	R2-0000159	[BALES, FRANCIS E, BOYD, RAYMOND]	[TRC SOLUTIONS, INC., U.S. ARMY CORPS OF ENGINEERS]	[WIEDEMER, ASHLEY]	[US ENVIRONMENTAL PROTECTION AGENCY]
213207	07/01/2011	SUPPLEMENTAL REMEDIAL INVESTIGATION WORK PLAN FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	69	[PLAN]	R2-0000160	R2-0000228	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[TRC ENGINEERS INCORPORATED]
213203	02/01/2014	FINAL SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT - REVISION 3 FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	4262	[REPORT]	R2-0000229	R2-0004490	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[TRC ENGINEERS INCORPORATED]
213204	02/01/2014	FINAL SUPPLEMENTAL FEASIBILITY STUDY REPORT - REVISION 3 FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	306	[REPORT]	R2-0004491	R2-0004796	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[TRC ENGINEERS INCORPORATED]
213206	02/18/2014	TRC SOLUTIONS RESPONSE TO US EPA QUESTIONS REGARDING THE APPLICATION OF BIOLOGICAL REMEDIES TO PORTIONS OF THE LIGHT NON-AQUEOUS PHASE LIQUID AND GROUNDWATER PLUMES FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	7	[LETTER]	R2-0004797	R2-0004803	[WIEDEMER, ASHLEY]	[US ENVIRONMENTAL PROTECTION AGENCY]	[BOYD, RAYMOND]	[TRC SOLUTIONS, INC.]
254314	04/10/2014	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CONCURRENCE ON THE PROPOSED AMENDED RECORD OF DECISION (ROD) DATED APRIL 2014 FOR OPERABLE UNITS 3, 4 AND 6 OF THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	1	[LETTER]	R2-0004804	R2-0004804	[MUGDAN, WALTER]	[US ENVIRONMENTAL PROTECTION AGENCY]	[SCHICK, ROBERT]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
254315	04/10/2014	PROPOSED PLAN FOR THE MATTIACE PETROCHEMICAL COMPANY INCORPORATED SITE	29	[PLAN]	R2-0004805	R2-0004833	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]

APPENDIX IV

State Concurrence Letter

New York State Department of Environmental Conservation
Division of Environmental Remediation
Office of the Director, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
Website: www.dec.ny.gov



Sent Via Email Only

July 24, 2014

Walter Mugdan, Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region II
290 Broadway, 19th Floor
New York, New York 10007-1866

Re: Mattiace Petro Chemicals Superfund Site
Site No. 130017
Superfund ROD Amendment

Dear Mr. Mugdan:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the Final Superfund Amended Record of Decision (AROD) and Responsiveness Summary dated July 2014 for Operable Units 3, 4 and 6 Mattiace Superfund Site. We concur with the amended remedy for these operable units which consists of bioventing of LNAPL; enhanced reductive bioremediation of groundwater; in-situ thermal treatment of areas of hot spot soil and groundwater contamination; upgrading and continued operation of the SVE system to capture soil vapors from the bioventing and in-situ thermal systems; partial vertical groundwater containment; and phytoremediation.

If you have any questions or need additional information, please contact Ms. Heidi-Marie Dudek by telephone at (518) 402-9813 or by email at heidi.dudek@dec.ny.gov.

Sincerely,

Robert Schick, P.E.
Director
Division of Environmental Remediation

cc: Sal Badalamenti, EPA
John LaPadula, EPA
Krista Anders, DOH
Bridget Boyd, DOH
Charlotte Bethoney, DOH
Michael Ryan, DEC
Michael Cruden, DEC
Walter Parish, DEC
Gerard Burke, DEC

R2-0004967

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOR THE
RECORD OF DECISION
MATTIACE PETROCHEMICAL CO., INC. SUPERFUND SITE
NASSAU COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of the significant comments and concerns submitted by the public on the U.S. Environmental Protection Agency's (EPA's) April 2014 Proposed Plan for the Mattiace Petrochemical Co., Inc., Superfund Site and the EPA's responses to those comments and concerns. All comments and concerns summarized in this document have been considered in the EPA's final decision in the selection of an amendment to a remedy that addresses soil gas and groundwater contamination at the Site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The 2013 Supplemental Remedial Investigation (SRI) and Feasibility Study (SFS) reports and the Proposed Plan for the contaminated groundwater at the Site were released to the public for comment on April 17, 2014. These documents were made available to the public at information repositories maintained at the Glen Cove Public Library and the EPA Region 2 Office in New York City. The notice of availability for the above-referenced documents was published in the *Glen Cove Pilot Record* on April 17, 2014. The public comment period ran from April 17, 2014 to May 19, 2014.

On April 28, 2014, EPA held a public meeting at the Glen Cove City Hall to inform officials and the public about the Superfund process, to present the Proposed Plan for the Site, including the preferred remedial alternatives, and to respond to questions and comments from the attendees (see Attachment 3 for a copy of the sign-in sheet for the meeting). Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in this Responsiveness Summary.

SUMMARY OF COMMENTS AND RESPONSES

Comments and/or questions were received at the public meeting and in writing via e-mail and U.S. mail. A summary of the comments provided at the public meeting and in writing, as well as EPA's responses to them, are provided below. The community was generally supportive of the proposed alternative presented, and only had minor comments and questions.

Attached to this Responsiveness Summary are the following Attachments:

- Attachment 1 Proposed Plan
- Attachment 2 Public Notice - Commencement of Public Comment Period
- Attachment 3 April 28 2014 Public Meeting Sign-In Sheets
- Attachment 4 April 28, 2014 Public Meeting Transcript
- Attachment 5 Written Comments Submitted During Public Comment Period

The comments that were received were grouped into the following seven categories based on the subject matter of the comment.

SITE CONDITIONS AND NATURE AND EXTENT OF CONTAMINATION

Comment #1: How far down is the water table at the Site?

Response #1: The depth to the water table varies depending on the location within the Site. In the southeastern area of the former Mattiace facility Property (Mattiace Property), the water table is relatively shallow at 5-10 feet below ground surface (bgs). As you move to the northwest, the water table gets deeper, at 15-20 feet bgs in the center of the Mattiace Property, and 25-30 feet bgs in the northwest corner. However, there is a steep incline to the Garvies Point Preserve property, and the water table is approximately 60-70 feet bgs in the area beyond the Mattiace Property boundary as a result of the change in topography.

Comment #2: Where is the groundwater divide? What direction is groundwater flowing?

Response #2: The groundwater divide runs generally east to west across the southern half of the Mattiace Property and coincides roughly with a subsurface mound in the upper surface of a clay layer that slopes to the south and to the north. See Figure 2 for its approximate location. The majority of groundwater on the Mattiace Property flows in the west-northwest direction, under the Garvies Point Preserve Property, towards the Hempstead Harbor. Because the groundwater divide is present, which generally tracks the upper surface of a clay layer beneath the southern portion of the property, some groundwater south of the divide flows to the south towards Glen Cove Creek.

Comment #3: Is the groundwater divide keeping contamination from migrating away rapidly? Are the on-site extraction wells for the existing groundwater pump and treat system drawing the groundwater back towards the Mattiace Property and shrinking the plume?

Response #3: Estimates of groundwater flow velocities on Long Island typically range from 0.5 to 2 feet/day. However, most contaminants have retardation factors that tend to slow their movement as a result of chemical reactions and physical processes. Based on the observations at the Site, the average velocity of plume movement is much less than the natural groundwater flow rate. The groundwater divide does not affect the groundwater flow rate, but rather the flow direction. The groundwater pump and treat system remedy was called for in the 1991 ROD for the Site became operational in 1998, and it is being amended with this ROD Amendment. The existing system withdraws groundwater and pulls it back towards the Site, however, it was determined not to be effective enough to completely treat and reduce the size of the plume in a reasonable timeframe.

Comment #4: Does the south plume go right through the proposed development of condominiums? What are the buildings to the south if they are not included in the redevelopment?

Response #4: The buildings on the southern adjacent properties are currently being used for commercial/industrial purposes. They are not proposed to be included in the waterfront redevelopment. There is a small portion of property across Garvies Point Road from the Mattiace

Property along the creek that is proposed to be included in the waterfront redevelopment. The current plans indicate this area to be used as green space, a walking path, and a marina.

Comment #5: Does the Mattiace Property have a contiguous lot line with the waterfront property?

Response #5: The adjacent properties to the west (20/30 Garvies Point Road) and to the south and east (1 Garvies Point Road) are not included in the waterfront redevelopment. These properties are currently being used for industrial/commercial purposes. The property immediately to the north of the Mattiace Property is included in the redevelopment plan. However, this property is proposed to be used as green space.

Comment #6: Who chose the particular area for the plume and did the plume migrate in the 15 years that you knew it was heading into Garvies Point Preserve or did you just not sample the other spots where the plume also might have headed?

Response #6: The plume generally follows the flow of groundwater direction. Groundwater flows in the west-northwest direction into and under the Garvies Point Preserve. The extent of the plume had not been fully delineated in the past. The understanding was that the plume only extended immediately off of the Mattiace Property. During the supplemental remedial investigation, additional sampling points were added in order to determine the extent of contamination. It is possible that some of the contamination has migrated in the past 15 years, but it is more likely that contamination was already present in this area 15 years ago, because the current remedial groundwater pump and treat system draws the groundwater back towards the Site.

Comment #7: Were the people living on Janet Lane notified about the Site? Are their homes impacted by the Site?

Response #7: Residents on Janet Lane were sent post cards to inform them of the Proposed Plan and public meeting. The homes on Janet Lane are not impacted by Site contamination. The extent of groundwater contamination is approximately 300 feet south of the homes and is not flowing in the direction of these homes. During past investigations, in 2008, a vapor intrusion study was conducted at these residences to determine if vapors were potentially migrating from the Site to the areas beneath or in the homes. The results of the study concluded that a vapor intrusion pathway did not exist and that no further action was necessary.

Comment #8: There are a lot of wells outside the area depicted as the plume. Were all of the wells installed sampled? Have none of them picked up any of this particular plume?

Response #8: The area within the yellow outline on Figure 17 is the area that is being addressed under this ROD Amendment. There are some wells that were installed and sampled outside of this area. Wells further to the west-northwest are not indicating the presence of contaminants. These wells are situated to monitor any possible changes in the plume's migration. Wells installed to the south of the Mattiace Property will be utilized during future investigations in that area. Low levels of contamination found in wells installed to the immediate east of the yellow area, will be addressed with the remedial components of this ROD Amendment.

Comment #9: How do you determine if neighboring properties are potential sources of contamination? Was testing done under 20/30 Garvies Point?

Response #9: The first step in remedial investigation is to start with a known source and work out from there collecting samples. Samples often have to be taken under numerous neighboring properties to track plumes. Information collected is then used to develop a conceptual site model. If data collected under the remedial investigation or other information about neighboring properties indicates that there may be sources contributing to contamination, additional investigation steps are taken (e.g. samples on the property would be taken, information request letters could be sent to learn more about their current and historical operations on the property). EPA has already sent information requests, and the information received is then reviewed and a determination made as to whether or not the information provided warrants further investigation. Additional groundwater and soil samples would also be collected from the properties, where appropriate. Vapor intrusion testing was done at both 1 Garvies Point Road and 20/30 Garvies Point Road in the past by EPA. The VI results from both structures showed elevated subsurface contamination, which prompted the need for indoor air sampling. Indoor air sampling was conducted at 1 Garvies Point Road and a vapor intrusion pathway was found to exist. The owner of the property chose to install a vapor mitigation system on the property. The owner of the other property denied EPA access when EPA returned to sample the indoor air of 20/30 Garvies Point Road. Therefore, a vapor intrusion study was not completed on that property.

Comment #10: The commenter asserts that on Page 3 of the Proposed Plan in the second paragraph, EPA states that “[t]he 1989 RI identified soil and groundwater contamination at the former Mattiace facility Property, and sediment contamination in nearby Glen Cove Creek.” This statement should be clarified based on the information contained in that document and the summary of this information on page 1-14 of the SRI Report, which states that the sediment contamination identified in Glen Cove Creek was not determined to be attributable to the Mattiace Site as there was similar contamination identified at both upstream and downstream locations in the Creek from the Site.

Response #10: Comment noted. EPA concurs that sediment contamination has not conclusively been determined to be attributable to Mattiace.

Comment #11: The commenter asserts that on Page 6 of the Proposed Plan in the second paragraph under the section entitled “North of the Divide,” EPA concludes in the last sentence that volatile organic compound (VOC) contamination in groundwater identified north of the clay mound and moving towards the west is “broadening the plume out to the south.” This conclusion should be deleted as it contradicts conclusions on page 3-8 and groundwater flow patterns shown on Figures 3-10 and 3-11 of the SRI/SFS documents concerning groundwater flow direction and plume conditions north of the groundwater divide. The data in these documents clearly show that the groundwater and plume are moving in a westerly or northwesterly direction north of the clay mound, and thus they do not in fact impact the plume towards the south.

Response #11: This statement was taken directly from the SRI report in Section 4.4.1. The statement has been modified in the ROD Amendment to clarify that the plume under the Garvies

Point Preserve Property broadens out to the north and south as it migrates. In other words, the northwest groundwater plume widens somewhat the further to the northwest it migrates.

SITE RISKS

Comment #12: What is the future plan for the usage of the Property after it is cleaned up? What level of health acceptability would it be cleaned up to?

Response #12: While EPA does not know the anticipated future use of the Property, the Property is currently zoned for commercial/industrial use. Because some of the neighboring properties are zoned residential, EPA determined that a reasonably anticipated future use of the Property could be residential. As a result, the Human Health Risk Assessment (HHRA) evaluated the potential future use for both commercial/industrial and residential use. When cleanup of the Site is completed the Property can be used without restriction. Until that time, EPA will rely on the Institutional Controls identified in the Selected Remedy to ensure that the Property is utilized in a manner that is protective of human health and the environment.

Comment #13: People are currently using Garvies Point Preserve, why is nobody concerned that there is a health threat? Are people that walk there in danger?

Response #13: Contamination found on the Garvies Point Preserve property is deep below the surface within the groundwater. Groundwater beneath the Preserve is approximately 70 feet below ground surface. Therefore, there is no direct contact exposure pathway to the public, and a health risk does not exist since the exposure pathway is not complete. See also Response #13.

Comment #14: What are the contaminants? Where do they come from? Are they carcinogens? What does it do to the human body? Are the people working in the buildings at risk currently?

Response #14: The primary media of concern for the Site are groundwater and soil gas. The primary contaminants of potential concern for the Site are VOCs. Acetone, 1,2-dichlorobenzene, 1,1-dichloroethane, cis-1,2-dichloroethene, ethylbenzene, methylene chloride, tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane, toluene, vinyl chloride, xylenes and other VOCs have been detected in on-site groundwater monitoring wells.

The main contaminants of concern at the Site are VOCs found in the groundwater in the aquifer beneath the Site. As described in the SRI report, and summarized in the Human Health Risk Assessment (HHRA), EPA identified waste at the Site that contributed to the groundwater contamination.

EPA evaluates potential cancer risks from exposure to chemicals classified as known, probable, or possible carcinogens in the baseline HHRA. The findings of the HHRA are detailed in the Summary of Site Risks section of the ROD Amendment. HHRA Table 11 summarizes the cancer risks provided in the HHRA. Receptors of concern include: Future On-site Utility Worker, Future On-site Adult and Child resident, and Future On-site Industrial Worker. Exposures to industrial workers beyond the Mattiace Property did not exceed the risk range.

In addition to the assessment of cancer risks described above, the HHRA also evaluates the potential non-cancer health hazards from exposures to chemicals. The goal of protection for noncancer health effects is a non-cancer Hazard Index of less than or equal to 1. Table 11 in the HHRA highlights pathways with a HI greater than 1 for the following receptors: Future On-Site Utility Worker, Future On-Site Construction Worker, Future On-Site Adult and Child Resident, and Future On-site Industrial/Commercial Worker.

At the current time, the only building on the Mattiace Property is the one which contains the pump and treat equipment. Exposure to workers in this building are covered under the Occupational Safety and Health Administration requirements established to protect the workers. Furthermore, when this building was designed and constructed, vapor barriers were installed.

Comment #15: How can a development go up without a threat to public safety and health? Who is going to invest a lot of money when things are unknown? If restrictions are going to be placed that prevent the aquifer to be used as drinking water, why would you consider cleaning it up to the standards of a drinking water source?

Response #15: EPA performed an HHRA that evaluated commercial/industrial as well as residential future use of the Property. A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step risk assessment process includes:

- *Data Collection and Evaluation (Hazard Identification)* – which identifies the COPCs at a Site based on factors such as toxicity, frequency of occurrence, and concentration;
- *Exposure Assessment* – which estimates of the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed (i.e., ingestion and dermal contact with contaminated subsurface soil and groundwater, and inhalation of volatilized chemicals from soil gas and from groundwater volatilizing while showering);
- *Toxicity Assessment* – which determines the types of adverse health effects associated with chemical exposures, and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response); and
- *Risk Characterization* – which summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site-related cancer risks and noncancer health effects.

The findings of the HHRA are detailed in the Summary of Site Risks section of the ROD Amendment. The HHRA indicated that there were no current risks associated with Site groundwater because there were no receptors (i.e. no one is currently exposed to the groundwater). The HHRA did indicate risk associated with a future resident (adult or child) based upon the hypothetical use of the Site groundwater as a source of drinking water. However, local regulations (NY ECL 15-527 and a Nassau County ordinance prohibiting the installation of new potable wells

in areas served by a public water supply) are in place that prevent the present and reasonably foreseeable future use of groundwater as a source of drinking water in this general area. In addition, when the remedy is complete EPA expects that the groundwater will have been restored and contaminant levels will be below drinking water standards. In the interim, EPA has selected institutional controls (ICs) as part of the remedy. These ICs include a restriction to prevent the withdrawal and use of Site-related groundwater for protectiveness in the short-term; these substantive restrictions on groundwater are already in place through existing well restriction regulations mentioned above, but because the Long Island and County ordinances apply to wells with greater than 45 gallons per minute pumping capacity and do not address the potential for non-potable use of on-site groundwater, additional site-specific institutional controls limiting well installation will be required for the Property. A Site Management Plan prepared in accordance to NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – Section 6.1 will also be developed.

CERCLA requires that remedial actions attain drinking water standards, wherever drinking water standards are applicable or relevant and appropriate requirements (ARARs). Furthermore, as stated in the NCP, EPA expects to return usable groundwater to beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of a site.

Comment #16: Can you provide information regarding whether thyroid cancer and thyroid disease may be related to exposure to tetrachloroethylene?

Response #16: The cancer assessments conducted at Superfund sites do not predict the risk for a specific type of cancer but rather predict the overall lifetime cancer risks from exposure to chemicals at a site with the potential to cause cancer. In addition, non-cancer health assessments evaluate whether an exposure exceeds a Reference Value that is developed based on the most sensitive health effect identified through a review of the toxicological data for a chemical. The Reference Value is an estimate of a level of daily exposure to the human population that is likely to be without an appreciable risk of deleterious effects during a lifetime.

The toxicity information used in the calculation of cancer risks and non-cancer health hazards from exposure to tetrachloroethylene in the Superfund assessment for the Site was obtained from EPA's Integrated Risk Information System (IRIS). IRIS provides a summary of toxicity information on over 550 chemicals. The IRIS file for tetrachloroethylene was developed by EPA following appropriate guidelines, guidance and policy. The IRIS assessment for a chemical goes through an extensive internal and external peer-review.

Cancer Assessment. The chemical file for tetrachloroethylene is available at: <http://www.epa.gov/iris/toxreviews/0106tr.pdf>. Section 6.1.4. of the report summarizes the cancer assessment, indicating:

- Tetrachloroethylene is classified as “likely to be carcinogenic to humans by all routes of exposure”. This conclusion is based on suggestive evidence of carcinogenicity in epidemiologic studies and conclusive evidence that the administration of

tetrachloroethylene, either by ingestion or by inhalation to sexually mature rats and mice, increases tumor incidence (JISA, 1993; NTP, 1986; NCI, 1977).

- The IRIS evaluation summarizes the available epidemiologic studies stating: “The available epidemiological studies provide a pattern of evidence associating tetrachloroethylene exposure and several types of cancer, specifically bladder cancer, non-Hodgkin lymphoma, and multiple myeloma. Associations and exposure-response relationships for these cancers were reported in studies using higher quality (more precise) exposure-assessment methodologies for tetrachloroethylene. Confounding by common lifestyle factors such as smoking are unlikely explanations for the observed results. For other areas of the body, including esophageal, kidney, lung, liver, cervical, and breast cancer, more limited data are available.”

Non-cancer Health Assessment. Section 6.2.1 of the IRIS Toxicological Review summarizes the available evidence for non-cancer health effects associated with exposure to tetrachloroethylene. As indicated at the meeting, EPA develops a non-cancer toxicity assessment to evaluate the potential health effects from exposure to a chemical. The non-cancer assessment evaluates the available literature to identify the most sensitive health effect.

Section 6.2.1. of the IRIS assessment states: “The database of human and animal studies on inhalation toxicity of tetrachloroethylene is adequate to support derivation of inhalation and oral reference values. A number of targets of toxicity from chronic exposure to tetrachloroethylene have been identified in published animal and human studies. These targets include the central nervous system, kidney, liver, immune and hematologic system, development and reproduction. In general, neurological effects were judged to be associated with lower tetrachloroethylene exposures.”

REMEDY SELECTION AND IMPLEMENTATION

Comment #17: How many years ago was the original remedy selected? Why did it take so long to figure out the remedy was ineffective?

Response #17: The original remedy, that this document is amending, was finalized in 1991. Although the ROD was finalized in 1991, operation of the groundwater pump and treat and soil vapor extraction systems did not begin until 1998, because of the sequencing of other cleanup activities, as well as the time needed for the design and construction of the remedial components. Therefore, the remedy has been operating for approximately 15 years. It is common for groundwater pump and treat systems to effectively remove contamination during the initial years of operation and then show declining performance trends. Once the data indicate that the system performance may be declining, the next step is typically an optimization effort. At this Site, several changes were made to the treatment system in an effort to improve its performance. After several years of monitoring the effects of those changes, a determination was made that the current system may not reduce concentrations in a reasonable timeframe and that alternative remedies needed to be evaluated. In order to evaluate alternatives, a supplemental remedial investigation was conducted, where additional data was collected over a two year period in order to determine the nature and extent of contamination remaining at the Site. Then, an evaluation of alternatives was prepared, and a Proposed Plan was issued, followed by this ROD Amendment that documents the

decision for the Site. It should be noted that although the current remedial system's performance has declined, it is still in operation and continues to remove contamination.

Comment #18: Who makes the final determination of the remedy?

Response #18: After taking into account all of the public comments, EPA with the concurrence of New York State Department of Environmental Conservation (NYSDEC) will make the final decision on the selected amendment to the remedy for the Site, and this decision is memorialized in the ROD Amendment.

Comment #19: Is Alternative 5B the best method or the fastest method?

Response #19: The timeframe for remedy completion is estimated at 34 years, which was similar to other alternatives. EPA compared each of the proposed alternatives to the nine evaluation criteria (see Text Box on page 16 of the ROD Amendment). Alternative 5B was determined to be the best method to treat the contamination found at this Site within a reasonable timeframe. The reasons for this determination include: rapid reduction of soil and groundwater contamination on the former Mattiace facility Property through thermal treatment, direct treatment of Light Non-Aqueous Phase Liquid (LNAPL) beneath the Garvies Point Preserve to eliminate an on-going source of groundwater contamination with bioventing, minimal impacts on Garvies Point Preserve through the use of horizontal extraction wells, optimization of current conditions with enhanced bioremediation and increased rate at which anaerobic microbes treat groundwater, limitation of future migration of contaminants during and after active remediation with the incorporation of the partial vertical barrier which could potentially benefit the redevelopment planned for the immediate area, and incorporation of green technologies.

Comment #20: What is the timeframe for getting the Site to cleanup levels?

Response #20: EPA estimates at least 1 year for the design of the remedial systems to be completed. Active components are estimated to be implemented for a 5-10 year duration from their start. Performance monitoring would be performed for approximately 24 additional years to monitor the effectiveness of active remediation components and natural attenuation processes. It should be noted that these are the best estimates that can be determined with the information available at this time, but actual timeframes can increase or decrease. The selected remedy in the 1991 ROD, if not amended, would take approximately an additional 150 years to attain cleanup levels.

Comment #21: Will all of the trees be disturbed in the Preserve? What about mitigation at the end?

Response #21: The selected remedy will significantly limit the impacts to trees in the Garvies Point Preserve through the use of underground horizontal extraction wells. EPA met with representatives of the Garvies Point Preserve on January 30, 2014, to explain the proposed remedy and solicit input on how best to minimize impacts to the Preserve. The horizontal wells will be installed along the slope of the hillside from the former Mattiace facility Property and be pushed under the Preserve. However, approximately 15 vertical venting wells are expected to be installed

on the Garvies Point Preserve property. These wells will be in the same vicinity as the monitoring wells that have already been installed during the SRI and past remediation. Any negative impacts to the Preserve will be mitigated in accordance with a restoration plan that will be developed during the remedial design. The restoration plan will be developed with input from the Garvies Point Preserve board/representatives.

Comment #22: A commenter evaluated the Proposed Plan and the rationale set forth in it for EPA's proposed "Preferred Alternative" (Alternative 5b), which is entitled "Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater, In-Situ Thermal Treatment of Hot Spots of the former Mattiace Property, Partial Vertical Containment Barrier, and Hydraulic Control via Phytoremediation." Because of the extensive scope, cost and effectiveness of the Preferred Alternative in removing residual contaminant mass from the Site, EPA should clarify that the use of MNA following active remediation is not restricted to any particular time frame. This recommendation is further supported by documented evidence in the SRI Report (Sections 4.4.11, Geochemical Parameters, 4.6.3, In-Situ Biodegradation, and 6.3.4, Distribution and Fate and Transport of COPCs in Groundwater) of Site conditions that are clearly conducive to additional degradation as evidenced by the significant on-going breakdown of contaminants of concern that is occurring in the groundwater at the Site.

Response #22: EPA concurs that the use of performance monitoring following active remediation is not restricted to a particular timeframe. Time frames are provided for cost estimating purposes, and the actual duration of performance monitoring will be determined based on the data collected during the implementation of the remedial action.

Comment #23: A commenter asserts that on Page 10 of the Proposed Plan under the section entitled "Remedial Action Objectives," EPA identifies the third remedial action objective as "Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and State Maximum Contaminant Levels (MCLs) on the former Mattiace facility Property and north of the groundwater divide." With respect to this objective, the following considerations, which individually and collectively make use of the referenced groundwater as a source of drinking water in both the short- and long-term remote and highly unlikely, should be considered in determining whether EPA establishes restoring groundwater in the shallow surficial aquifer to Safe Drinking Water Act MCLs as a Remedial Action Objective as well as the amount of time considered reasonable for restoration of groundwater.

As discussed on page 12 of the Proposed Plan, EPA acknowledges that existing laws and regulations (NY ECL 15-527) are in place that prevent the present and reasonably foreseeable use of groundwater as a source of drinking water in this general area. The overall quality of the groundwater beneath the Site has been, and will continue to be, further degraded by urban activities, such as road salting in the winter, unrelated to historical activities on the Property. The groundwater yield is very limited at the Site (only one well of the 13 existing extraction wells in the shallow surficial aquifer yields more than 0.5 gpm and that a well 6 inches in diameter yields ~ 3 gpm maximum and is located in the Garvies Point Preserve Area), such that the shallow groundwater does not constitute a viable water supply source. Even if the groundwater beneath the Site could be extracted in a manner that could provide a sufficient yield to be considered a viable water supply, its proximity to the adjacent Bay and limited hydraulic flux as shown in the

Groundwater Modeling report contained in Appendix D of the SRI Report would result in salt water intrusion if the groundwater was actively pumped. Such extraction would similarly render the shallow groundwater in the area unusable in both the short and long-term.

Given these factors, and because EPA has selected a proposed remedial alternative (In-Situ Thermal Treatment) that will more rapidly reduce the highest contaminant concentrations at significantly greater cost when compared to other remedial alternatives that have been determined to be protective of human health and the environment (e.g. Alternative 4d), a Remedial Action Objective designed to achieve a goal of restoration of groundwater to MCLs is unwarranted as there are neither demonstrable means nor plans for shorter or intermediate term need for use of the groundwater. Additionally, given the current and reasonably anticipated lack of groundwater use for drinking water in the area at issue, and the condition of the shallow groundwater in the area of the Site attributable to sources other than the Site, at a minimum EPA should defer evaluating whether achievement of MCLs (while desirable) is actually viable, or necessary, until after the remedy is implemented and sufficient time has elapsed to examine its effectiveness.

Response #23: See the Response to Comment #15. EPA does not concur that attainment of MCL groundwater standards should not be a remedial action objective at the Site. The state groundwater classification for the Site is GA, which indicates that the groundwater could be used as a source of potable water supply. Thus, because the groundwater is designated as a potential drinking water source, achievement of MCLs is required as an ARAR. If, during the remedial action, data indicates achievement of MCLs may not be technically practicable in a reasonable timeframe, or if the aquifer's Class GA designation is changed, the remedial action objective may be reevaluated at that time.

Comment #24: A commenter asserts that on Page 15 in the Proposed Plan under the section summarizing Alternative 5b, EPA states that "[t]he existing groundwater extraction and treatment system would be restarted if the hydraulic control of groundwater migration to the northwest is necessary or if water levels behind the partial vertical barrier are not maintained through the tree root systems." During the development of the SRI/SFS, TRC and EPA addressed this very issue (i.e. the potential for significant mounding of groundwater behind the partial vertical barrier and the effectiveness of the phytoremediation system in controlling groundwater levels). During those discussions, several options other than re-starting the existing extraction and treatment system were presented as being viable alternatives for hydraulic control, including capping the area to reduce infiltration and installation of a french drain to route groundwater flow through the clay mound to the northwest. In those discussions, EPA agreed that should such a hydraulic control issue arise, TRC would evaluate various approaches and propose to EPA appropriate actions to address the issue. While one option could include re-starting the system, other viable remedial options clearly exist and should be evaluated at the time based on all information then known about the Site. EPA should modify this discussion in the final amended remedy to provide for an evaluation of technically feasible and effective alternatives if and when conditions mandate further action to address hydraulic control.

Response #24: EPA has clarified in the discussion of the amended remedy to include the evaluation of technically feasible and effective alternatives in the event the trees' roots systems

are ineffective and an alternative technology may be necessary to maintain hydraulic control behind the vertical barrier. This evaluation is to be conducted during the remedial design phase.

Comment #25: A commenter asserts that on Page 19 of the Proposed Plan under the section describing the Preferred Remedy (Alternative 5b), EPA states in the last paragraph that, “[t]he enhanced reductive bioremediation system, consisting of vertical injection wells, would be constructed both on the former Mattiace facility Property where thermal treatment would not address contamination and in the [Preserve] areas where elevated concentrations of [contaminants of concern] VOCs have been detected in groundwater.” This statement is inconsistent with the description of Alternative 5b in the SFS, which proposed the use of enhanced reductive bioremediation system on the Preserve property but contemplated in-situ thermal treatment for soils and groundwater in the Mattiace Property. EPA should clarify that the use of the biological approach in isolated locations on the Mattiace Property represents a contingent remedy solely to the extent it is determined to be necessary at some future time to address residual groundwater impacts that are not being adequately reduced by natural attenuation processes.

Response #25: EPA agrees that the potential areas requiring implementation of bioremediation on the Mattiace Property would be determined after the effects of the in-situ thermal treatment are evaluated. The need for bioremediation injections would only be required on the Mattiace Property if residual groundwater impacts remain after in-situ thermal treatment and data indicate natural attenuation processes would not be effective at reducing concentrations to acceptable levels in a reasonable timeframe. The language in the ROD Amendment reflects this approach.

Comment #26: A commenter asserts that on Page 20 of the Proposed Plan, EPA states that “[a] long-term groundwater and surface water monitoring program would be developed and implemented to track and monitor changes in the groundwater contamination.” As set forth in the SFS description of the remedial alternatives, any surface water monitoring was to be restricted to monitoring surface water runoff during remedial construction activities, and would not extend to sampling of adjacent surface water bodies, which is not a consideration in the SFS. Therefore, the amended remedy should exclude any reference to a surface water monitoring program except one related to monitoring surface waste runoff during remedial construction activities. EPA has provided no rationale as to why any ongoing post-remedial construction surface water monitoring program is necessary, and should EPA now believe one is necessary despite the lack of reference to it in the EPA-approved SFS, no opportunity for public comment on any such rationale has been provided. If EPA believes an ongoing surface water monitoring program is necessary to protect human health or the environment, the Agency needs to set forth the rationale for any such conclusion and afford the public a reasonable opportunity to comment on it.

Response #26: While it is not accurate to state that no opportunity for public comment has been provided (indeed, its presentation in the Proposed Plan is for that very purpose), the ROD Amendment does not require surface water sampling or monitoring. The potential for Creek sampling will be considered during the future south groundwater investigations.

Comment #27: Contamination extends into the neighboring properties, but remediation is confined to the Mattiace Property and in the Preserve. What is going to happen to the adjacent private property?

Response #27: Small amounts of contamination that are found on the adjacent property to the east of the Mattiace Property will be addressed through the remedial components of the amended remedy when it is constructed/implemented on the Mattiace Property and Preserve. Site-related contamination found to the south of the Mattiace Property will be evaluated during future investigations. EPA will be investigating whether additional potential sources exist on adjacent properties that may be contributing to the contamination found to the south of the former Mattiace Property.

RESPONSIBLE PARTIES AND SITE PROPERTY QUESTIONS

Comment #28: How many acres is the total Property at Mattiace?

Response #28: The Property is 1.9 acres. Note that the Mattiace Superfund Site extends beyond the Mattiace Property boundary. The extent of groundwater contamination extends approximately 700 feet from the northwest Mattiace Property boundary and is approximately 200-300 feet wide. A figure of the extent of contamination can be seen in Figure 4.

Comment #29: Who is the current owner, who would be the seller, and who pays the taxes on the Property?

Response #29: According to the Nassau County Clerk's Office, the current record owner of the Mattiace Property is Mattiace Industrial Sales Co., Inc. However, EPA does not know whether that entity currently exists. EPA has no information about the current status of the payment of real property taxes on the Mattiace Property (i.e., whether taxes are being paid and, if so, by whom).

Comment #30: Who is paying for the cleanup? Who is the Responsible Party?

Response #30: The cleanup and the investigations in support of the SFS have been performed by TRC Engineers, Inc. TRC's work is being funded through a settlement among certain parties that arranged for the disposal of materials at the Mattiace Property which contributed to the contamination found at the Site. Those parties were contacted by EPA and reached a settlement whereby they agreed to implement or fund work at the Site.

Comment #31: What are the block and lot numbers of the parcels that actually comprise this particular parcel and its plume?

Response #31: The block and page for the deed to the Mattiace Property is Block 7494, Page 218.

TREATMENT ALTERNATIVES

Comment #32: What is phytoremediation? Does it require high energy ultraviolet light to treat the problem?

Response #32: Phytoremediation is the direct use of green plants and their associated microorganisms to stabilize or reduce contamination in soils, sludges, sediments, surface water, or

groundwater. Phytoremediation works best where contaminant levels are low, because high concentrations may adversely affect plant growth and take too long to achieve a clean up. Plants also help prevent wind, rain, and groundwater flow from carrying contaminants away from a site to surrounding areas or deeper underground. For this Site, phytoremediation would be added in the southern portion of the Mattiace Property to extract groundwater so as to provide hydraulic control of the increased water table elevation that may be caused by the partial vertical containment barrier. The main purpose of the trees would be to provide some level of control of groundwater elevations, but the phytoremediation system may also extract some VOC contaminants from the southern portion of the Mattiace Property. The use of UV light to destroy contaminants is an alternative form of treatment, not proposed or selected for this Site.

Comment #33: The plume is underground and relatively safe to humans now. When you pull it up will the VOCs become airborne and would this present a health concern?

Response #33: VOCs within soils or groundwater can be transferred to the gaseous state as a result of different remedial technologies, like the thermal treatment and bioventing components in the amended remedy. In-situ thermal treatment methods heat contaminated soil and nearby groundwater to very high temperatures. The heat vaporizes the chemicals and water, changing them into gases. These vapors can move more easily through soil. Those gases will be captured within piping, and then sent to the existing on-Site treatment plant and treated using activated carbon or an alternative measure before being released into the atmosphere. The bioventing system will be designed and installed to introduce oxygen and remove carbon dioxide from the defined residual LNAPL smear zone. Horizontal extraction and vertical air inlet wells will be designed to be installed in the permeable zone at the top portion of the water table where the majority of the residual LNAPL and in the smear zones. Air is withdrawn from the vadose zone under a low vacuum, which introduces air flow from the vertical air inlet wells into the horizontal extraction wells. The air provides oxygen for microbial activity in the vadose and smear zones and accelerates the aerobic degradation of the LNAPL and residual organic COCs. The operation of the bioventing system will be designed to remove the chlorinated VOCs either as vapors with the extracted air or by dissolving them into the groundwater, where they will be degraded by anaerobic bacteria. Like those from thermal treatment, extracted vapors will be captured within piping, and then sent to the existing on-Site treatment plant and treated using activated carbon or an alternative measure before being released into the atmosphere.

VAPOR INTRUSION

Comment #34: Is it more dangerous when you start putting up buildings? Would the construction of a building cause all of the contaminants to resurface?

Response #34: If a building is constructed over a contaminated plume, it can create a potential exposure pathway. Contaminated vapors emanating from saturated soils or groundwater can collect under the slab of the building. These vapors can migrate into the indoor air through cracks in the floor, resulting in occupants of the building being exposed to those vapors' volatile contaminants. However, measures can be taken during construction or even post-construction to ensure that the vapors move outside of the building envelope rather than into it. If any structure

is built over the plume in the future, EPA would require that testing be conducted to assess the potential for vapor intrusion or EPA could require measures to be taken as part of the construction to mitigate vapor problems. These concerns regarding future construction of buildings on the Mattiace Property would be addressed using institutional controls.

OTHER

Comment #35: The commenter asserts that on Page 20 of the Proposed Plan, EPA states that, “[t]he environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2’s Clean and Green Energy Policy and NYSDEC’s Green Remediation Policy 13. This would include consideration of green remediation technologies and practices.” Given that this issue was not discussed in the SFS, it is the commenter’s understanding that this language was included as a generic evaluation requirement, and not a requirement for specific actions at the Site under the planned remedial action. We further note that the selected remedial alternative, which includes the use of phytoremediation and in-situ technologies, already represents a far more sustainable remedy than the inefficient extraction remedy that it replaces.

Response #35: The language referenced is included as an evaluation requirement on all remedial projects. It is within EPA’s discretion to require consistency with this EPA policy document even if it is not specifically discussed in any detail in the SFS.

Attachment 1

Proposed Plan

Mattiace Petrochemical Co., Inc., Superfund Site Glen Cove, Nassau County, New York

April 2014

THE EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for amending the remedial approach for addressing soil gas and groundwater contamination at the Mattiace Petrochemical Co., Inc., Superfund Site (the Site) and identifies the preferred remedy with rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), the lead agency for the Site, in consultation with the New York State Department of Environmental Conservation (NYSDEC). The EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C § 9617(a), as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. §§ 300.430(f) and 300.435(c). The nature and extent of the contamination at the Site and the remedial alternatives summarized in this Proposed Plan are described in the final remedial investigation (RI) report and the feasibility study (FS) report, both issued in February 2014, as well as other documents contained in the Administrative Record for this Site. The EPA encourages the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted.

This Proposed Plan is being provided as a supplement to the above-noted documents to inform the public of the EPA's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred alternative. The current remedy includes groundwater and soil vapor extraction treatment systems. This plan proposes an amendment to the current remedy to address on Property contamination and a portion of the plume that has migrated away from the property toward the northwest. The preferred alternative involves bioremediation of Light Non-Aqueous Phase Liquid (LNAPL) and groundwater, in-situ thermal treatment of soil and groundwater hot spots on Property, partial vertical containment, hydraulic control via phytoremediation, and natural attenuation processes in groundwater.

Changes to the preferred remedy, or a change from the preferred remedy to another remedial alternative, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after the EPA has taken into consideration all public comments. The EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis of alternatives section of the FS Report, because the EPA in consultation with NYSDEC may select a remedy other than the preferred alternative.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:

April 17, 2014 to May 19, 2014

EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: April 28, 2014 at 7:00 pm

EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at Glen Cove City Hall.

COMMUNITY ROLE IN SELECTION PROCESS

The EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS Reports and this Proposed Plan have been made available to the public for a public comment period which begins on April 17, 2014 and concludes on May 19, 2014.

A public meeting will be held during the public comment period at Glen Cove City Hall on April 28, 2014 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

Ashley Wiedemer
Remedial Project Manager
Eastern New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Telephone: (212) 637-4263
Fax: (212) 637-4284
e-mail: wiedemer.ashley@epa.gov

INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Glen Cove Public Library
4 Glen Cove Avenue
Glen Cove, New York 11542
Telephone: (516) 676-2130
Hours of operation:
Monday - Thursday, 9am - 9pm
Friday, 9am - 5pm
Saturday, 9am - 5pm
Sunday - 1pm - 5pm

USEPA - Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308

SITE BACKGROUND

The former Mattiace Petrochemical Co., Inc., Site is located in Glen Cove, Nassau County, New York. Its location is shown in Figure 1. From colonial times through the 19th century, clay mining was performed in the vicinity of the Site and likely significantly altered the natural geology of the area. An analysis of historic aerial photographs indicates that the Site was not developed for industrial purposes prior to 1953. Between 1953 and 1966 significant excavation and backfilling activities were conducted in the area in the vicinity of the Site for industrial development.

The Mattiace Petrochemical Company began operating at a facility located on Garvies Point Road in the mid-1960s (referred to here as the "former Mattiace Property" or the "Property") receiving chemicals by tank truck, blending

and redistributing them to its customers. The primary operations were the storing, blending, and repackaging of organic solvents. These solvents were stored in aboveground and underground storage tanks (ASTs and USTs, respectively), and were blended and repackaged in 55-gallon drums under a covered section of the concrete loading dock located in the northeast corner of the former Mattiace Property. The 55-gallon drums were stacked and temporarily stored on the loading dock prior to shipment to various buyers.

A metal Quonset hut, which was located in the western portion of the former Mattiace Property, was used by M and M Drum Cleaning Company to clean, pressure test, and repaint drums. The M and M Drum Cleaning Company and the Mattiace Petrochemical Company were both owned by Mattiace Industries. Aqueous solvent mixtures accumulated during the two Companies' operations were collected in a wetwell in the southeast external corner of the Quonset hut. The liquids in this wetwell were periodically discharged to one of the adjacent ASTs or into a leaching pool on the former Mattiace Property.

Thirty-two USTs and 24 ASTs were located in the northeastern section of the former Mattiace Property for the storage of organic solvents. The USTs were interconnected as part of a spill prevention system. Excess material from overfilled tanks drained through a series of four concrete manholes and discharged into the solvent/stormwater separator, located in the southeast corner of the Property. This spill prevention system also acted as a stormwater collection system.

In 1986, the Mattiace Petrochemical Co. filed for bankruptcy as a result of legal problems resulting from its non-compliance with various environmental regulations. At the request of the State of New York, the bankruptcy court removed the protection of assets normally extended to a reorganizing company in 1987 in order to ensure that the company ceased operations. Meanwhile, in August 1988, a jury returned felony charges against the company and its President for violations of State environmental laws. On July 8, 1988, the EPA notified the Mattiace brothers of their status as potentially responsible parties at the Mattiace Site, as well as provided them the opportunity to remediate the Site through an EPA consent order. No offer was received by the EPA in response to this notification. In August, 1988, a Federal lien was placed on the Mattiace Property by the EPA.

In February 1988, the EPA implemented a removal action which included waste characterization and the eventual removal of approximately 100,000 gallons of hazardous materials in drums, USTs, and ASTs.

The EPA added the Site to the Superfund National Priorities List (NPL) on March 30, 1989.

The EPA initiated a second removal action in 1990, consisting of the removal of a collapsed retaining wall along the western property boundary of the former Mattiace Property, with subsequent regrading and replacement with a lower retaining wall.

The EPA also began a Site-wide RI/FS in October 1989. The EPA also initiated a focused feasibility study (FFS) in December 1989 to evaluate remedial alternatives for a cache of drums buried along the western boundary of the former Mattiace Property. The 1989 RI identified soil and groundwater contamination at the former Mattiace Property, and sediment contamination in nearby Glen Cove Creek. Soil contamination was extensive across the entire Property, with hot spots of contamination occurring in several locations. These hot spots were generally associated with USTs, leaching pools, and chemical transfer locations on the Property. Site contaminants identified consisted mainly of volatile organic compounds (VOCs) including tetrachloroethylene (PCE) and its breakdown products, and xylenes. The groundwater contamination attributable to the Site was found to be particularly severe, and included localized layers of LNAPLs under the Site, usually consisting of a mixture of organic chemicals like xylene, trichloroethylene (TCE), PCE and toluene.

The EPA issued a ROD in September 1990 (1990 ROD) requiring the excavation and off-site disposal of buried drums found at the Site. The EPA issued a second ROD in June 1991 (1991 ROD), selecting a comprehensive remedy to address the remaining soil and groundwater contamination at the Site. The EPA determined that the actual or threatened releases of hazardous substances from the Site, if not addressed by the selected remedies, could present a current or potential threat to human health and the environment through inhalation of particulates and/or vapors from contaminated soils, dermal absorption of contaminated soils, and ingestion, inhalation or dermal absorption of contaminated groundwater (based on a potential future residential land use scenario).

The 1991 ROD selected the following remedial actions for the Site:

- in-situ vacuum extraction of VOCs from soil in the general Site area;
- excavation of pesticide hot spots with off-site treatment and disposal;

- demolition, removal, and landfill disposal of Site structures, above-and below-ground storage tanks, and concrete and asphalt debris;
- groundwater extraction and treatment via air stripping and carbon adsorption, followed by reinjection; and
- monitoring of groundwater in the area of the Site, as well as surface water and sediments in Glen Cove Creek.

The cleanup work required by the 1990 and 1991 RODs was organized into six Operable Units (OUs) to facilitate implementation, as follows:

OU 1 -Excavation of pesticide hot spots

OU 2 -Excavation and off-site disposal of drums and contaminated soils

OU 3 -Extraction/treatment/reinjection of contaminated groundwater

OU 4 -In-situ vapor extraction of residually contaminated soils

OU 5 -Demolition and disposal of existing Site structures, including above-ground and below ground tanks; and

OU 6 -Pumping/disposal of floating product layer (LNAPL).

What is NAPL?

Non-aqueous phase liquids (NAPLs) are hydrocarbons that exist as a separate, immiscible phase when in contact with water and/or air. Differences in the physical and chemical properties of water and NAPL result in the formation of a physical interface between the liquids which prevents the two fluids from mixing. Nonaqueous phase liquids are typically classified as either light nonaqueous phase liquids (LNAPLs) which have densities less than that of water, or dense nonaqueous phase liquids (DNAPLs) which have densities greater than that of water.

The remedial action objectives for the two RODs have been achieved for all OUs except OU3, 4, and 6. All capital construction for OUs 3, 4 and 6 has been completed, and the associated treatment systems continue to operate to address contaminated groundwater and soil gas. To minimize potential exposures at the Site while remedial activities are ongoing, fencing, signs, and other measures have been installed.

In July 2003 pursuant to a Consent Decree (CD) between the EPA and numerous potentially responsible parties (PRPs), TRC Environmental (TRC) assumed implementation of the remedial action at the Site associated with the OUs 3 and 4 treatment facilities from the EPA. Since 2003, TRC has continued the remedial action associated with the OUs 3 and 4 treatment facilities. TRC has implemented several changes to the remedy in an

attempt to optimize treatment facility performance. The EPA also performed soil vapor intrusion and related groundwater investigations in close proximity to the Site to determine if potential exists for vapors from contaminants in the groundwater are migrating through soils into buildings above the groundwater. Soil vapor intrusion testing was performed for Janet Lane residences in 2007 and nearby commercial structures in 2007 and 2008. Residential vapor intrusion testing results indicated that sub-slab vapors were below the EPA's guidelines and no further action was required to address that potential concern.

The OU 3/4 treatment facility has been fully operational since September 1999 and has removed an estimated 10,000 pounds of VOCs from groundwater and soil since that time. In the 1991 ROD, the EPA estimated that the soil vapor extraction and treatment part of the integrated treatment facility would take 4 to 6 years to reach soil cleanup criteria. However, the system has been operating for over 14 years and soil cleanup objectives have not been met, and do not appear likely to be met in the foreseeable future. The groundwater extraction and treatment part of the remedy was anticipated to take approximately 30 years to achieve the cleanup criteria specified in the ROD. However, the data suggests that this goal is not likely to be achievable within that timeframe. This Proposed Plan, therefore, proposes amendments to the OU3, OU4 and OU6 remedies in the 1991 ROD and proposes a new preferred remedy to address the contamination remaining at the Site, as discussed in more detail below.

Because the soil cleanup levels have not been reached and the groundwater cleanup levels are not likely to be achieved within the estimated 30 year timeframe, TRC performed a supplemental RI (SRI) beginning in September 2011. The SRI included investigations to determine the nature and extent of an LNAPL plume of contamination northwest of the former Mattiace Property, the extent and direction of migration of the contaminants of concern (COCs) in groundwater north and west of the former Mattiace Property, source of the COCs detected in groundwater monitoring wells MW-01 and MW-4S located south and southeast, respectively, of the former Mattiace Property, and current concentrations of COCs in migration pathways at the Site to evaluate current Site risks. The media of concern at the Site is groundwater and soil gas.

SITE CHARACTERISTICS

Site Topography, Geology and Hydrogeology

The topography of the Property was modified in the past by a series of retaining walls in order to achieve a relatively

flat surface with a slight slope downward toward the south. The Property is bordered on the north by a steep wooded hillside that rises more than 30 feet above the Property. Near the western boundary of the Property, a concrete retaining wall separates the access road to the Property from the adjacent 20-30 Garvies Point Road property's parking lot, approximately 20 feet below the Site. Along the southern boundary, a retaining wall is used to raise the elevation of the Site more than 10 feet relative to the apparent natural grade of the area. Along the eastern property boundary ground elevation adjacent to the Property also decreases, particularly in the southern portion of the Property where a retaining wall is present. The natural topography to the northwest of the Property is an undisturbed steep wooded ridge that rises to a forest whose surface elevation is approximately 73 feet above mean sea level (AMSL) north of the Site and approximately 102 feet AMSL northwest of the Site. This wooded ridge slopes from the north to the south, dropping to the parking lot at 20-30 Garvies Point Road at an elevation of approximately 16 feet AMSL.

The Site is underlain by Pleistocene-aged upper glacial deposits consisting primarily of stratified fine to coarse sand, with gravel boulders, and silty sand with lenses of clay and silt. Some discontinuous fill material is also present on the Property. The saturated thickness of the shallow deposits form the Upper Glacial Aquifer (UGA), which is under unconfined (water table) conditions. A locally continuous shallow clay layer has been observed within the upper glacial deposits and generally above the regional water table. This shallow clay layer contains perched groundwater both within the clay and perched top of the clay. This clay unit extends from the northwest portion of the Property, along much of the northern portion of the study area and occurs primarily, but not entirely, under the Preserve.

An extensive clay aquitard, referred to as the Lower Clay Unit, exists beneath the fill and glacial deposits across the entire Site. Beneath the southern part of the Property, the upper surface elevation of the Lower Clay Unit is at its highest (about 22 feet AMSL) and it slopes off to the south and to the north, forming an east-west trending subsurface clay mound. A natural valley in the Lower Clay Unit extends in a westerly direction from the northern portion of the Site, and its surface elevation is as deep as (-)62 feet AMSL at the western limit of the study area.

Groundwater flows from the Property in two general directions, to the south and to the north and northwest, generally divided by the clay mound in the Lower Clay Unit that underlies the southern portion of the Property, referred to as a groundwater divide. The fluctuation in groundwater levels at the Site-wide monitoring well

network over time has been observed to be on average greater than five feet; however, wells northwest of the Property had a smaller range of fluctuations under non-pumping conditions.

Conceptual Site Model

The distribution of the residual phase LNAPL, or NAPL that is trapped in the pore spaces between the soil particles, and cannot be easily moved hydraulically, indicates LNAPL migrated to the northwest as a result of the groundwater surface gradient in the area. It is estimated that the Site contains a plume of approximately 346,500 pounds of LNAPL, which contains approximately 116,000 pounds of identified VOCs.

Subsurface hot spots that remain on the Property after OU2 remediation were identified during 2003 and 2006 soil investigations. Detected concentrations of VOCs exceeded 1991 ROD soil cleanup objectives and were primarily limited to four soil boring locations, SSB-03, SSB-06, SSB-11, and MW-17.

The groundwater plume extends approximately 700 feet off of the former Mattiace Property in the west northwest direction. The extent of chlorinated ethenes and benzene, toluene, ethylbenzene and total xylenes (BTEX) north of the groundwater divide follow the groundwater flow system, converging into the west trending valley in the upper surface of the Lower Clay Unit. Groundwater flow from the former Mattiace Property to the south is minimal. Potential impacts to the south of the former Mattiace Property are subject to future investigation and will be addressed as a separate OU.

The Chemicals of Potential Concern (COPCs) for groundwater are as follows: total chlorinated ethenes (PCE, TCE, cis-1,2-dichloroethylene (cis-1,2-DCE), and vinyl chloride (VC)), BTEX (primarily ethyl benzene and xylenes), individual chlorinated VOCs (1,1,1-Trichloroethane (1,1,1-TCA), dichloromethane, 1,2-dichlorobenzene and chloroform) and individual COPCs (naphthalene and manganese).

Results Of The Remedial Investigation

The results of the 2011-2012 RI indicate an LNAPL and associated groundwater plume that is migrating from the Site in the northwesterly direction and is contaminated with multiple VOCs, primarily cis-1,2-DCE, TCE, VC, naphthalene, bis-(2-ethylhexyl)phthalate and multiple metals.

Supplemental Remedial Investigation (SRI) field work activities, performed between September 2011 and

February 2013, addressed the following: the nature and extent of the LNAPL plume northwest of the former Mattiace Property; the extent and direction of migration of the COPCs in groundwater north and west of the former Mattiace Property; the source of the COCs detected in groundwater monitoring wells MW-01 and MW-4S located south and southeast, respectively, of the former Mattiace Property; and the current concentrations of COCs in migration pathways at the Site. This was conducted to evaluate current Site risks.

LNAPL Delineation

Between September 2011 and May 2012, a total of 18 ultra violet optical screening tool (UVOST) laser-induced fluorescence (LIF) points (TRC-UVOST-6 to TRC-UVOST-23) and six soil borings were advanced to define the limits of the LNAPL plume north, northwest and west of the former Mattiace Property in the Glen Cove Development Authority (GCDA) and the Nassau County Garvies Point Preserve (NCGPP) parcels and at 20-30 Garvies Point Road.

During the installation of the UVOST LIF points, the potential presence of LNAPL was determined by the measured fluorescence response of subsurface materials. During the advancement of soil borings, soil samples were collected and screened with a photoionization detector (PID) and visually evaluated for the presence of LNAPL.

Analyses indicate that the LNAPL consists primarily of petroleum constituents, but it also contains chlorinated VOCs. The responses of the LIF probes indicate the LNAPL saturation in the residual phase is a relatively low percentage of saturation. The extent of LNAPL free phase and residual phase is shown in Figure 2, illustrating the minimum and maximum extent of each zone. The expected mass is estimated to be approximately 346,500 lbs. of LNAPL. The 2009 LNAPL analyses exhibit an average of approximately 33.4 percent of the LNAPL to be VOCs that are COCs. Therefore, the 346,500 pounds of LNAPL are estimated to contain approximately 116,000 pounds of VOC COCs.

Groundwater Investigation

Twenty-four soil borings were advanced at locations north, northwest and west of the former Mattiace Property, 18 soil borings were advanced at locations near MW-01, and 10 soil borings were advanced at locations near MW-45 as shown on Figure 3. Soil samples were collected and submitted for laboratory analysis for VOCs included on the EPA's target compound list (TCL) of compounds for which to screen from 14 soil borings. A temporary groundwater monitoring point was placed into each borehole. Groundwater samples were collected and

submitted for laboratory analysis for TCL VOCs. Additionally, a total of 28 groundwater (shallow and deep) monitoring wells were installed at locations shown on Figure 3. Shallow groundwater monitoring wells were screened approximately five feet above and ten feet below the water table, while deep monitoring wells were screened approximately five feet above the surface of the lower confining clay unit.

Three comprehensive rounds of groundwater sampling were conducted between November 2011 and February 2013, with 53 to 63 monitoring wells sampled in each round. Analytes varied, but included TCL VOCs, MNA parameters, phospholipid fatty acids, *dehalococcoides ethenogenes* deoxyribonucleic acid, TCL SVOCs, TCL pesticides and/or target analyte list metals.

The groundwater COCs identified in the SRI Report are grouped as follows: total chlorinated ethenes (PCE, TCE, cis-1,2-DCE and VC), BTEX (ethylbenzene and meta and para-xylenes (total xylenes is used for convenience)), individual chlorinated VOCs (1,1,1 TCA, dichloromethane, 1,2-dichlorobenzene, chloroform, and 1,2-dichloroethane), and individual COCs (2-butanone, naphthalene, and manganese). As discussed below, the groundwater COCs are also differentiated between constituents carried forward for the area north of the clay mound and groundwater divide and the area south of the clay mound and groundwater divide.

North of the Divide

The extent of chlorinated ethene contamination in groundwater can be seen in Figure 4. A groundwater plume north of the divide extends from the former Mattiace Property approximately 700 feet west northwest direction beneath the NCGPP Property. The highest concentrations of total chlorinated ethenes (greater than 100,000 micrograms per liter (µg/L)) are in the northeast corner of the former Mattiace Property. The dissolved-phase chlorinated ethenes continue to follow the groundwater flow path, converging with the groundwater flow into the lower portions of the valley in the Lower Clay Unit. The extent of chlorinated VOCs drops off near the downgradient edge of the residual phase LNAPL. This indicates that once groundwater migrates beyond the LNAPL area, which acts as a continuing source of groundwater contamination, concentrations decline quickly. Analysis of the SRI results indicate cis-1,2-DCE is the predominant chlorinated ethene present in the plume throughout the length of the plume, with VC being the secondary constituent detected throughout the eastern portion of the plume.

Two other elevated total chlorinated ethene concentration areas are south of the former northeast USTs in an area

located adjacent to the former stormwater drain line and the former USTs on the eastern Property boundary and in the vicinity of the former stormwater separator. Groundwater flow from both of these locations is to the west or northwest and follows the general westerly groundwater flow that converges into the valley in the Lower Clay Unit. These source areas contribute to the extent of chlorinated VOCs detected to the west of the Property, broadening the plume out to the south.

Isoconcentration maps for individual chlorinated ethenes, as well as BTEX, 1,1,1-TCA, dichloromethane, and 1,2-dichlorobenzene are provided in the SRI report. The extent of the BTEX plume is very similar to the chlorinated ethenes plume, with the highest concentration in the vicinity of the former northeast USTs. Lower concentration peaks are also present to the south of the northeast UST area.

Like the total chlorinated ethenes plume, the dissolved-phase BTEX plume converges into the valley in the Lower Clay Unit west of the Site. BTEX concentrations from the northeast corner of the former Mattiace Property are fairly consistent to the west until about 660 feet downgradient of the source area.

The 1,1,1 TCA concentration distribution is very similar to the distribution of total chlorinated ethenes in the northeast portion of the Site, with its western migration route, downgradient of the former USTs. 1,1,1 TCA concentrations decline along the western flow path. Downgradient of this well, the 1,1,1 TCA concentrations decline rapidly, like the chlorinated ethenes and BTEX, to levels less than the NYSDEC Class GA Groundwater Quality Standard (5 µg/L).

The distribution of dichloromethane is similar to that observed for total chlorinated ethenes, although its concentrations are lower and it declines to non-detection levels in a relatively shorter distance than for the chlorinated ethenes.

The source of 1,2-dichlorobenzene is likely the former northeast UST area. Concentrations are shown to decline west of the Site, but they remain relatively stable between 120 µg/L and 150 µg/L. However, no 1,2 dichlorobenzene is present at the further downgradient wells.

1,2-dichloroethane is detected within the source areas north of the divide at relatively low concentrations compared to the chlorinated ethenes. Concentrations drop off dramatically downgradient, although there were elevated detection limits at some wells. Near the downgradient edge of the chlorinated ethenes plume, 1,2-dichloroethane is present at 2.6 µg/L and concentrations

decline further to non-detectable levels (<1 µg/L) at downgradient wells.

The highest concentrations of contaminants are present in the vicinity of the former USTs and near the southern USTs. Limited areas are in excess of the NYSDEC Class GA Value (50 µg/L) as detected in a few monitoring wells downgradient of these former source areas, within the chlorinated ethenes and BTEX plume footprint.

Naphthalene data show that the highest concentrations are present in the vicinity of the former USTs, but they decline to non-detection levels in downgradient wells.

Iron and manganese samples show that the majority of samples contain iron and manganese concentrations in excess of their combined NYSDEC Class GA Value (500 µg/L). The source of both iron and manganese is most probably a result of dissolution of iron hydroxides and manganese dioxide from the soils because of the strongly anaerobic conditions associated with the groundwater.

Clay Mound and South of the Divide

For the purposes of this investigation, the scope of addressing groundwater in the vicinity of the clay mound and area south of the divide is limited to within the former Mattiace Property boundary and the retaining wall to the west of the Property boundary. The groundwater flow on the southern portion of the Property is influenced by the shallow topography of the Lower Clay Unit, the overlying interbedded silts, clays, and sands, and the structures that extend into the shallow clay. Structures that extend into the shallow clay include the retaining walls along the entrance road and several buildings south of the Property.

Total chlorinated ethenes (comprised almost entirely of cis-1,2-DCE and VC) were detected at greatest concentrations (greater than 10,000 µg/L) in groundwater samples collected from monitoring wells located in the southwest corner of the former Mattiace Property. Total chlorinated ethenes were detected at concentrations ranging from below detection limits to 440 µg/L in groundwater based on samples collected from other monitoring wells south of the divide.

BTEX was detected at the greatest concentrations in the groundwater samples collected from monitoring wells located in the southeast corner of the former Mattiace Property. BTEX was detected at concentrations ranging from non-detection to 276 µg/L in groundwater based on samples collected from other monitoring wells south of the divide.

Further investigation and evaluation of groundwater contamination and its potential sources south of the former Mattiace Property will be required in the future.

Assessment of Natural Degradation: Geochemical Parameters

Several water quality parameters have been analyzed as general indicators of the reducing-oxidizing (redox) conditions and other geochemical conditions in the groundwater. The constituents discussed here include nitrate-nitrogen, sulfate, sulfide, methane, dissolved oxygen (DO), redox potential (ORP), and pH. Based on the data, the groundwater throughout the chlorinated ethenes and BTEX plume is strongly reducing, in the sulfate reducing-to-methanogenic range.

Groundwater geochemical data provide a good indication of the redox conditions present at a location within an aquifer. The geochemical parameters that indicate the redox conditions in groundwater are as follows (in order of weaker to stronger reducing conditions): oxygen depletion, nitrate reducing conditions indicated by low nitrate-nitrogen concentration; iron reducing conditions indicated by high dissolved divalent iron; sulfate reducing conditions indicated by low sulfate concentrations or the presence of sulfide; and methanogenic conditions indicated by the presence of dissolved methane.

The strength of the reducing conditions in groundwater is of significance for the chlorinated ethenes because the higher chlorinated parent compounds (PCE and TCE) can biodegrade in groundwater under weakly anaerobic conditions (e.g., nitrate to iron reducing), whereas the daughter breakdown products require stronger reducing conditions (i.e., sulfate reducing conditions or methanogenic conditions).

An analysis of the data of the redox sensitive parameters reveals that the presence of nitrate-nitrogen, divalent iron, sulfate, sulfide, and methane indicate that there are methanogenic conditions present throughout the extent of the chlorinated ethene and BTEX plumes.

The pH of the groundwater ranged from 3.95 to 10.94 for the 2011 sampling date, with an average of about 7.0. The majority of the pH values are within the range conducive to biodegradation (between pHs of 5 to 9).

The preliminary screening approach for assessing reductive dechlorination is presented in Appendix N of the SRI Report for each well. The interpretation of this score in the 2009 EPA guidance is as follows: 0 to 5 inadequate evidence for anaerobic biodegradation of chlorinated organics, 6 to 14 limited evidence for anaerobic biodegradation of chlorinated organics, 15 to 20 adequate

evidence for anaerobic biodegradation of chlorinated organics, and >20 strong evidence for anaerobic biodegradation of chlorinated organics. Most of the wells within the core of the chlorinated VOC plume score greater than 20, indicating strong evidence for anaerobic degradation of chlorinated organics.

Based on multiple lines of evidence, the chlorinated ethenes and BTEX are being degraded in the groundwater on and downgradient of the former Mattiace Property. These lines of evidence include the following: the decline in the parent compound concentrations (both the chlorinated ethenes and BTEX are declining), the presence of daughter (or breakdown) products, the decline in those daughter products, and the presence of appropriate biogeochemical conditions (the strongly reducing conditions (methanogenic conditions) appropriate for degradation of the chlorinated ethenes. In addition, microbial populations of *dehalococcoides ethenogenes* are present in significant concentrations. BTEX are also degraded in these anaerobic conditions). Other COCs in this area, 1,1,1-TCA, dichloromethane, 1,2-dichlorobenzene, and chloroform are present at much lower concentrations and decline in concentration downgradient of the former Mattiace Property.

Soil Vapor

Total chlorinated ethene and BTEX concentrations in soil vapor monitored on the former Mattiace Property relative to remedial system performance show that soil vapor concentrations have declined dramatically, but with significant variability, part of which could be attributed to differences in the status of the extraction systems during sampling periods. Despite a dramatic decline in soil vapor concentrations, the levels still pose a potential future risk to receptors.

SCOPE AND ROLE OF ACTION

This Proposed Plan addresses groundwater and soil gas contamination on the former Mattiace Property and to the areas to the north and west. This proposed plan recommends amendments to the 1991 ROD remedies for OUs 3, 4 and 6 to address on-Property contamination and a portion of the plume that has migrated away from the property in to the northwest. The major source of the groundwater and soil gas contamination at the Site is the LNAPL plume, which was not fully characterized at the time of the 1991 ROD. The agency has concluded that the current remedial actions to address OUs 3, 4, and 6 are unlikely to achieve the remedial action objectives of the 1991 ROD or address this newly identified LNAPL plume, leading the agency to issue this proposed plan.

The 1991 ROD addressed surface soils (within the first two feet of ground surface) at the Site, and they are no longer a media of concern. This action addresses subsurface soils, as discussed in more detail, below..

Further investigation and evaluation of groundwater contamination and its potential sources south of the former Mattiace Property will be performed in the future.

SUMMARY OF SITE RISKS

As part of the 2011-2012 RI, the EPA conducted a baseline risk assessment to estimate the current and future effects of Site contaminants on human health and the environment. A baseline risk assessment is required and is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land, groundwater, surface water, and sediment uses. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment.

The cancer risk and non-cancer health hazard estimates in the HHRA are based on Reasonable Maximum Exposure (RME) scenarios consistent with Superfund Risk Assessment Guidance and were developed by taking into account various health protective estimates about the frequency and duration of an individual's exposure to those contaminants selected as COPCs, as well as the toxicity of the contaminants. Cancer risks and non-cancer health hazard indices (HIs) are summarized below. Please see the text box on page 11 for an explanation of these terms.

Both current and future land use scenarios were considered and developed to represent potential situations in which humans may be exposed to contaminants originating from the Site. The current zoned land use for the Property is industrial, and this current zoning formed the basis for assessing exposure under current conditions. Because nearby properties are zoned for residential use, the risk assessment also considered the potential for future residential use of the Property. Human health exposure scenarios evaluated in the HHRA include the following:

- Current land uses:
 - o Current off-site commercial/industrial worker exposed via inhalation of volatiles via vapor intrusion from groundwater and soil gas. Consistent with EPA Vapor Intrusion Guidance, off-site buildings located within 50 feet of the groundwater plume are evaluated in the risk assessment.
- Current/Future land uses:
 - o Current/future Utility Worker (on-site)

exposed to on-site subsurface soil and on-site shallow groundwater during repair of utilities.

- Current/future construction worker (on-site) exposed to on-site subsurface soil and shallow groundwater while digging.
- Future land uses:
 - Future on-site resident (adult and child) exposed to subsurface soil, groundwater and soil gas in the event that the property is developed for residential use in the future.
 - Future on-site commercial/industrial worker exposed to groundwater and soil gas in the event that the property is developed for industrial use in the future.

The results of the risk analysis characterization are presented in two forms. In the case of human health effects associated with exposure to potential carcinogens, risk estimates are expressed as the lifetime probability of additional cancer risk associated with the given exposure. The cancer risk estimates are calculated as the cancer-based exposure intake in units of milligrams/kilogram-day (mg/kg-d) multiplied by the cancer slope factor ((mg/kg-d)⁻¹). In numerical terms, these risk estimates are presented in scientific notation. Thus, a lifetime risk of 1E-04 (or 10⁻⁴) means a lifetime incremental risk of one additional person contracting cancer in ten thousand people; a lifetime risk of 1E-06 (10⁻⁶) means an incremental lifetime risk of one additional person contracting cancer in one million people.

For estimating risks posed by individual non-carcinogens, the hazard quotient (HQ) is used. The HQ is calculated as the non-cancer exposure intake (mg/kg-d) divided by the reference dose (RfD) (mg/kg-d). Chronic RfDs are used for scenarios involving long-term exposures (i.e., industrial and residential). The HQs are summed across chemicals to calculate a hazard index (HI) for each pathway in each scenario. HIs that exceed the goal of protection of an HQ or an HI equal to 1 are further evaluated based on the specific target organ and/or systemic effects associated with the chemical.

The estimated cancer risks are compared to the risk range presented in the NCP. Specifically, for known or suspected human carcinogens, acceptable risks are generally concentration levels that represent an additional cancer risk of between 10⁻⁴ (1 in ten thousand) and 10⁻⁶ (1 in a million) to an individual under a RME. The 10⁻⁶ risk level is used as the point of departure for determining risk based remediation goals. The estimated non-cancer HIs are compared to the concentration associated with the goal of protection of a HQ equal to 1. Thus, the hazard index

ratios that may constitute a concern are those greater than an HI of 1.

A summary of the cancer risk and non-cancer hazard estimates for the 2013 HHRA prepared for the Site is presented in Table 1. As indicated in Table 1, the total estimated cancer risks exceeding the goal of protection of 1 x 10⁻⁶ by receptor are: 2 x 10⁻⁴ for the current/future on-site utility worker; 6 x 10⁻⁵ for the current/future on-site construction worker; 4 x 10⁻² for the future on-site adult resident and 5 x 10⁻² for the future resident child; and 1 x 10⁻² for the future on-site industrial/commercial worker. Risks to the current off-site industrial/commercial worker are 1 x 10⁻⁴ (South Commercial Property) and 2 x 10⁻⁶ for the current off-site industrial/commercial worker (West Commercial Property). The potential risks to the off-site industrial/commercial worker on the south commercial property and for the off-site industrial/commercial worker on the west commercial property are due to vapor intrusion. These calculated risks are within the acceptable risk range of 1 x 10⁻⁴ to 1 x 10⁻⁶, due to vapor intrusion associated with groundwater impacts. The estimated total non-cancer HIs associated with current off-site industrial/commercial worker exposures due to vapor intrusion are 0.1 (west commercial property) and 1.1 (south commercial property).

The primary cancer risks and non-cancer health hazards identified in the 2013 HHRA were associated with the future use residential scenarios, due mainly to exposures to groundwater and on-Site soil gas under the RME scenarios. Total cancer risks were within the acceptable risk range of 1 x 10⁻⁴ to 1 x 10⁻⁶ for future on-site construction workers (i.e. 6 x 10⁻⁵) and above the acceptable risk range for future on-site utility workers (2 x 10⁻⁴) and future adult and child residents (4 x 10⁻² and 5 x 10⁻², respectively or a total risk for children and adults of 9 x 10⁻²).

Total non-carcinogenic hazards associated with exposures to groundwater for the future resident child is calculated as an HI of 7,000 and for the future resident adult HI of 4,600. The hazards from exposure to the on-Site soil gas for the future industrial/commercial worker is an HI of 150. These HIs exceed the goal of protection of an HI of 1 or less under all of the future use scenarios.

Exposures to subsurface soils were below the carcinogenic risk goal of protection of 1 x 10⁻⁶ or non-carcinogenic hazard goal of protection of an HI of 1 under all of the exposure scenarios (i.e., on-site utility worker, on-site construction worker, future on-site resident including both children and adults, and future on-site industrial/commercial worker).

Future exposures to on-site shallow groundwater posed hazards above the goal of protection of an HI of 1 for the on-site utility worker receptor HI of 6.1 and on-site construction worker HI of 55. Multiple VOCs contributed to the risks and hazards including naphthalene and bis(2-ethylhexyl)phthalate, and multiple metals (i.e., arsenic, cobalt, cadmium, iron, manganese and nickel). The chemicals of concern driving the cancer risk and non-cancer hazards above the acceptable cancer risks and non-cancer health hazard levels were the VOCs TCE, cis-1,2-DCE, PCE, toluene, 1,1-dichloroethane, 1,2-dichlorobenzene, 1,2-dichloroethane, 1,4-dichlorobenzene, 2-butanone, benzene, chloroform, dichloromethane, ethylbenzene, toluene, and VC, the semi-VOCs bis(2-ethylhexyl)phthalate and naphthalene, the pesticides 4,4'-DDD, and the metals arsenic (inorganic), cadmium, cobalt, iron, manganese, and nickel. These chemicals were among those with the highest cancer risk and non-cancer hazard estimates.

The COCs identified based on modeled soil gas concentrations included 1,2-dichloroethane, benzene, carbon tetrachloride, chloroform, ethylbenzene, *p*-dichlorobenzene, PCE, TCE, and VC.

Calculated cancer risks and non-cancer health for the Central Tendency Exposure (CTE) or average individual exposures were also calculated. The results of this analysis are provided in Appendix O of the Remedial Investigation Report – Baseline Human Health Risk Assessment, Table 12. Remedial decisions in the Superfund program are based on the calculated cancer risks and non-cancer health hazards to RME individuals while the CTE calculated risks and hazards provide additional information to the risk manager. The CTE cancer risks and non-cancer health hazards for the CTE on-site utility worker (HI = 6.1), CTE on-site construction worker (CTE = 48); future on-site adult resident (HI = 2,700); future on-site child resident (HI = 3,500); and future on-site industrial/commercial worker (HI = 1,100) all exceeded the goal of protection of an HI = 1. In addition, the cancer risks for the future on-site adult resident (7×10^{-3}); future on-site child resident (1×10^{-2}); and future on-site industrial/commercial worker (4×10^{-3}) all exceeded the cancer risk range established under the NCP.

The screening level ecological risk assessment (SLERA) was conducted for the Site and it was determined that there were no complete ecological pathways at the Site and, therefore, the Site does not pose a risk to ecological receptors.

Summary of Human Health and Ecological Risks

The results of the HHRA indicate that the contaminated

groundwater presents an unacceptable human health exposure risk to future potential receptors. The SLERA indicated that the Site does not pose any unacceptable risks to ecological receptors.

Based upon the results of the RI and the risk assessment, The EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed may present a current or potential threat to human health or welfare or the environment. The EPA has determined that the preferred alternative identified in this Proposed Plan is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals identified to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels, if applicable.

The following RAOs have been identified for the Site:

- Reduce the risk to human health associated with potential ingestion, dermal contact with and inhalation of VOCs in groundwater to acceptable levels;
- Prevent LNAPL from acting as a continuing source of groundwater and soil gas contamination; and
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and State MCLs on the former Mattiace Property and north of the groundwater divide.

To achieve these RAOs, EPA has identified Maximum Contaminant Levels (MCLs) for the Site contaminants established under the Safe Drinking Water Act in the groundwater as remediation goals for the Site. While the contaminants within the LNAPL plume and the remaining hotspots can be found in subsurface soil and groundwater, the subsurface soil alone does not pose an unacceptable risk, and does not warrant its own remediation goals. Similarly, the agency expects that, by achieving MCLs in groundwater, the risks posed by exposure to soil gas will also be addressed. Selected MCLs for identified COCs can be attached in Table 2.

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment: A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the Site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6} , corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the Site and are referred to as Chemicals of Concern or COCs in the final remedial decision or Record of Decision.

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1), 42 U.S.C. 9621(b)(1) of CERCLA, mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section

121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. Section 121(d) of CERCLA further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA.

Detailed descriptions of the remedial alternatives considered to address the contamination associated with the Site can be found in the FS Report. The FS Report presents 9 source control and groundwater alternatives, including a "no further action" alternative.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, procure contracts for design and construction, or operate a system to achieve remediation of the contamination at the Site.

Common Elements of the Alternatives

Several of the alternatives described below, with the exception of the no further action alternative, include common major elements which do not change significantly in scope from one alternative to another. The major elements common to the alternatives include geospatial location, groundwater and soil gas monitoring, institutional controls, natural attenuation processes, hot spot soil excavation and disposal and NCGPP restoration which are discussed in further detail below.

The free and residual phase LNAPL plume in the northern portion of the Site represents the most significant continuing source of contamination to Site soils and groundwater. It is estimated that approximately 85 percent of the area covered by the LNAPL plume is located off-Property to the north (under the GCDA parcel) and northwest (under the NCGPP parcel). Therefore, in order to make substantial progress towards meeting the Site RAOs, the alternatives discussed herein are primarily focused within the area of the LNAPL plume. While some alternatives include remedial activities in other areas of the Site, each of the alternatives, with the exception of the No Further Action Alternative, is focused primarily on addressing LNAPL impacts to soil and groundwater, which are mostly off-Property under the NCGPP.

With the exception of the No Further Action Alternative, each of the alternatives would include groundwater and

soil gas monitoring. Groundwater monitoring involves the continued monitoring of ground water quality and water levels at the Site. The purpose of this monitoring program is to identify changes in ground water quality as a result of groundwater remediation and natural attenuation processes and to identify restoration of the aquifer. Detailed monitoring plans will be developed in the future during the remedial design of the selected remedy.

Institutional controls proposed under the remedial alternatives may include the establishment of environmental easements or deed notices to document any residual soil contamination and, if necessary, evaluate the need for the implementation of vapor barriers and vapor intrusion systems for any future buildings constructed on the former Mattiace Property. For those alternatives which include a vertical containment barrier, institutional controls would also be required to protect the integrity such a barrier. Institutional controls regarding groundwater are already in place through existing well restriction regulations for Long Island (NY ECL 15-527) and a County ordinance prohibiting the installation of new potable wells in areas served by a public water supply. However, ECL 15-257 applies to wells with a greater than 45 gallons per minute pumping capacity and does not address the potential for use of on-site groundwater to be used for non-potable purposes. Therefore, a groundwater restriction will be necessary for prohibiting the use of groundwater at the Site. A Site Management Plan prepared in accordance to NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – Section 6.1 will also be required.

Natural attenuation processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. Existing data, as discussed above, indicate that natural attenuation processes at the site are already addressing contamination present in the groundwater. EPA expects that monitoring the performance of the active treatment components will be relied upon to achieve the remediation goals, after the active remedial components have addressed the LNAPL plume, the remaining on-Property soil hotspots and areas of groundwater with higher contaminant concentrations. These active remedial components are expected to be effective for high-concentration areas but will become less effective at reducing contaminant concentrations for low-level areas. However, these active treatment components are expected to enhance the natural attenuation processes occurring at

the Site. EPA would seek to optimize the use of the active and passive components of the remedy, and would not rely upon performance monitoring until it is evident that enhanced natural attenuation would be as, or more effective, as the active components of the remedy at further reducing contaminant concentrations. Long term performance monitoring of the VOC contamination transformation resulting from the active treatment and the attenuation processes would be used to ensure that the groundwater quality improves until the performance standards identified are achieved. EPA would rely on the most current EPA MNA guidance to determine the effectiveness of the natural attenuation processes at reducing the remaining low-level concentrations to achieve ARARs in a reasonable timeframe. If the performance monitoring demonstrates that conditions would not be effective at reducing the remaining low-level concentrations in a reasonable timeframe, modifications and optimization of the active treatment components would be implemented followed by additional performance monitoring. An additional timeframe of 24 years is used for developing cost estimates associated with O&M activities, including well maintenance and groundwater monitoring of these additional attenuation processes.

Existing data indicate that areas of residual soil contamination may remain in the vadose zone above the LNAPL smear zone, or in areas where free product occurred in the soil and was then smeared across the soil when the water table fluctuated between historic high and low water table elevations, in the vicinity of soil borings SSB-3 and SSB-11. These borings are located near the existing treatment building and an existing electrical transformer, preventing the implementation of any current remedial activities relative to these soils. It is possible that the operation of existing and proposed active treatment components have already addressed or will in the near future address these soil impacts. If ARARs for these two soil hot spots are not achieved, they will eventually require excavation and off-site disposal. The cost for the excavation and treatment/disposal of soils from these two hot spot soil areas is included in the remedial cost estimates for Alternatives 2 through 4 and is considered in the evaluation of these alternatives. Otherwise, through the thermal treatment component of Alternative 5, these areas would be addressed.

In order to implement certain components of each alternative, wells will need to be installed on the NCGPP property. Construction will take this into account and every effort will be made to minimize the impacts to the Preserve. A restoration plan that addresses any short term impacts caused by the construction of the wells will be developed in consultation with the NCGPP.

Alternative 1: No Further Action

Under this alternative, the current groundwater pump and treat and SVE system would be discontinued and no removal or treatment of LNAPL or groundwater would be conducted. This alternative would not reach remedial action objectives in a reasonable time frame.

<i>Capital Cost:</i>	\$0
<i>Annual O&M Costs:</i>	\$0
<i>Present-Worth Cost:</i>	\$0

Alternative 2: Existing Dual Phase/SVE and Groundwater Remediation Systems

This remedial alternative involves an expansion of the existing dual phase/SVE and groundwater remediation systems to provide greater coverage of the LNAPL and groundwater plumes to the north and west of the former Mattiace Property. Both soil vapor and groundwater extraction systems would be expanded. Additional soil vapor and groundwater extraction wells would be installed, along with the associated piping to convey the soil vapor and groundwater to the existing treatment building. This alternative also includes common elements described as above. For cost estimating purposes this alternative is estimated to take at least 74 years to reach remedial action objectives through at least 50 years of groundwater pumping and treatment and SVE system operations followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$3.2 Million
<i>Annual O&M Costs:</i>	\$12.2 Million
<i>Present-Worth Cost:</i>	\$18.5 Million

Alternative 3a: Air Sparging

Air sparging is a treatment process that uses injected air to remove volatile or biodegradable contaminants from the saturated zone of an aquifer. Air is injected directly into the saturated zone transferring VOCs from the dissolved phase or LNAPL to the vapor phase through an air stripping process. The stripped compounds are then biodegraded and/or removed via SVE in the vadose zone. This alternative would require the construction and implementation of an air sparging system, including the installation of numerous air sparge wells on the former Mattiace Property and in the areas north and west of the former Mattiace Property on the Preserve parcel. Air compressors, blowers, piping and associated control systems would be required to inject and withdraw the air from the subsurface. The existing soil vapor treatment system could be used to treat the extracted soil gas

although it would have to be expanded to handle the additional air flow. Operation of the existing groundwater pump-and-treat system would cease. This alternative also includes common elements as described above. For cost estimating purposes, this alternative is estimated to take 44 years to reach remedial action objectives, through 10 years of operating the air sparge system, 10 years to allow the aquifer to return to highly reduced conditions, followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$12.8 Million
<i>Annual O&M Costs:</i>	\$4.4 Million
<i>Present-Worth Costs:</i>	\$20.7 Million

Alternative 3b: Air Sparging with Partial Containment

This alternative is the same as Alternative 3a with the addition of partial containment. A vertical containment system, involving a slurry wall and/or sheet pile wall, would be installed to provide additional control of the potential migration of contamination in areas where the depth to the nearest subsurface clay layer is sufficiently shallow to support the use of these containment technologies. The barrier would limit the future migration of both impacted groundwater and soil gas away from the former Mattiace Property. The use of vertical containment would be limited to the general former Mattiace Property boundaries adjacent to developed properties (i.e., to the east, south and west of the Property), to limit potential migration in these directions during and after remedy implementation. The depth of the underlying clay would limit the feasibility of containment in the areas to the north and northwest of the former Mattiace Property. For cost estimating purposes, this alternative is estimated to take 44 years to reach remedial action objectives through 10 years of operating the air sparge system and 10 years for the aquifer to return to highly reduced conditions followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$13.4 Million
<i>Annual O&M Costs:</i>	\$4.4 Million
<i>Present-Worth Cost:</i>	\$21.5 Million

Alternative 4a: Bioremediation of LNAPL through Bioventing and Performance Monitoring of Groundwater

Alternative 4a includes bioremediation of LNAPL through the installation of a bioventing system. Bioventing involves the vacuum-induced flow of air (oxygen) into the subsurface to facilitate aerobic microbial biodegradation. Bioventing utilizes lower airflow rates than SVE, thereby providing only enough oxygen to sustain microbial activity (i.e., it is not intended to air strip contaminants

from soil). As the air moves through the biologically active soil, biodegradation treats the VOCs that are adsorbed to the vadose zone soils and the VOCs in the soil vapor. Bioventing would be used in the LNAPL plume, where it would be expected to enhance aerobic biological degradation of hydrocarbons present in the LNAPL and the associated vadose portion of the smear zone. The biological degradation process produces fatty acids that, in turn, could be used by the anaerobic bacteria that are already present in the groundwater to continue the natural degradation of the chlorinated VOCs in the groundwater, and the saturated portion of the smear zone.

Implementation of this alternative would require the construction and implementation of a bioventing system in the LNAPL area on the former Mattiace Property and to the north and west of the Property. Air extraction wells, air intake vent wells, blowers to extract air, piping, and associated control systems would be required to inject and withdraw the air from the subsurface. To minimize the potential impacts to the Preserve property, this alternative includes the use of horizontally-drilled bioventing vapor extraction wells. The extraction wells would be drilled horizontally from the former Mattiace Property and extend to beneath the Preserve. The existing SVE system would be used to treat the extracted vapors. Additionally, the operation of the existing on-site soil vapor extraction system would be continued in the areas of SSB-03 and SSB-11 to address the shallow soil contamination in these two areas. A new SVE well would be installed at each of these locations. Under this alternative, operation of the existing groundwater pump-and-treat system would be discontinued.

This alternative also includes the common elements as described above. For cost estimating purposes, this alternative is estimated to take 55 years to reach remedial action objectives, through 5 years of operating the bioventing system and 50 years of performance monitoring.

<i>Capital Cost:</i>	\$1.7 Million
<i>Annual O&M Costs:</i>	\$1.1 Million
<i>Present-Worth Cost:</i>	\$3.3 Million

Alternative 4b: Bioremediation of LNAPL and Enhanced Bioremediation of Groundwater

Alternative 4b differs from Alternative 4a in that it adds enhanced reductive bioremediation for groundwater remediation. In areas of the Site where existing conditions are not conducive to optimal anaerobic bioremediation rates (e.g., low pH, lack of sulfate, or presence of aerobic groundwater conditions), substances would be selected and introduced to the aquifer/groundwater to change these

limiting conditions. The substances, referred to as amendments, which are anticipated to be used initially, based on current Site conditions, are sulfate and lactate. Amendments would be delivered to these areas either through subsurface injection at temporary injection points, injection wells, or modified venting wells. For cost estimating purposes, this alternative is estimated to take 33 years to reach remedial action objectives through 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$1.7 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$5.2 Million

Alternative 4c: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with Partial Containment

Alternative 4c includes alternative 4b with the addition of a vertical containment system, involving a slurry wall and/or sheet pile wall to provide additional control of the potential future subsurface migration of contamination in areas where the depth to a subsurface clay layer is sufficiently shallow to support the use of these containment technologies. The barrier would limit future migration of both impacted groundwater and soil gas away from the former Mattiace Property to adjacent properties to the west, south and east as a result of the active remedy. The use of vertical containment would be limited to the general boundaries to the east, south and west on the Property to limit potential future migration in these directions during and after remedy implementation. For cost estimating purposes, this alternative is estimated to take 33 years to reach remedial action objectives through 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$2.3 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$5.9 Million

Alternative 4d: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with Partial Containment and Hydraulic Control

This alternative includes all of alternative 4c and adds the use of trees and their root system, known as phytoremediation, as a supplemental hydraulic control measure to the containment provided by the vertical containment system. Phytoremediation is the use of

grouping of trees' root systems to absorb groundwater and thus reduce the flow and contain the spread of groundwater contamination at a site. It would be implemented in the southern portion of the former Mattiace Property for hydraulic control in order to maintain water levels behind the vertical barrier. Phytoremediation in this area was evaluated and groundwater flux calculations provided the bases for proposed use of 75 willow, poplar and/or cottonwood trees. While it is intended that phytoremediation would be utilized primarily for hydraulic control in the southern portion of the former Mattiace Property, the trees may also provide phytoremediation of groundwater contamination. For cost estimating purposes, this alternative is estimated to take 33 years to reach remedial action objectives through 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$2.5 Million
<i>Annual O&M Costs:</i>	\$2.7 Million
<i>Present-Worth Cost:</i>	\$6.2 Million

Alternative 5a: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater with In-Situ Thermal Treatment of Hot Spots on the former Mattiace Property

Alternative 5 is identical to alternative 4b, with the addition of in-situ thermal treatment of the soil and groundwater hot spots found to be on the former Mattiace Property and elimination of the potential hot spot soil excavations. In-situ thermal treatment can be used to treat subsurface soil, free-phase LNAPL, and, in some cases, nearby groundwater. It involves the heating of subsurface materials to high temperatures, which vaporizes contaminants. These vapors are collected and treated by an extraction system. In-situ thermal treatment would be focused on hot spot areas on the Property. One possible method would consist of electrical resistance heating, which uses arrays of electrodes to create a concentrated flow of current towards a central neutral electrode. Resistance to flow in the soils generates heat greater than 100°C, producing steam and readily mobilizing contaminants. The implementation would require the installation of subsurface electrodes in the hot spot treatment areas.

This alternative also includes the common elements as described above. For cost estimating purposes, this alternative is estimated to take 34 years to reach remedial action objectives through 1 year of thermal treatment, 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$6.09 Million
<i>Annual O&M Costs:</i>	\$2.10 Million
<i>Present-Worth Cost:</i>	\$9.80 Million

Alternative 5b: Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater, In-Situ Thermal Treatment of Hot Spots on the former Mattiace Property, Partial Vertical Containment Barrier and Hydraulic Control via Phytoremediation

Alternative 5b includes the components of Alternative 5a, with the addition of a partial vertical containment barrier and phytoremediation. The partial vertical containment barrier would provide additional control of the potential future migration of contamination during remedial implementation in areas where the depth to the subsurface clay layer is sufficiently shallow to support the use of this containment technology. The barrier would prevent the future migration of impacted groundwater and vapors to the west, south and east adjacent properties as a result of subsurface heating during active thermal treatment remediation. Alternative 5b also includes the use of phytoremediation as a supplemental hydraulic control measure to maintain water levels behind the partial vertical containment barrier. The existing groundwater extraction and treatment system would be restarted if the hydraulic control of groundwater migration to the northwest is necessary or if water levels behind the partial vertical barrier are not maintained through the trees root systems. For cost estimating purposes, this alternative is estimated to take 34 years to reach remedial action objectives through 1 year of thermal treatment, 5 years of operating the bioventing system and 9 years of enhanced bioremediation injections followed by 24 years of performance monitoring.

<i>Capital Cost:</i>	\$ 6.0 Million
<i>Annual O&M Costs:</i>	\$ 3.3 Million
<i>Present-Worth Cost:</i>	\$ 11.2 Million

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Refer to the table titled Evaluation Criteria for Superfund Remedial Alternatives for a description of the evaluation criteria.

This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. A more detailed analysis of the alternatives can be found in the FS Report.

Overall Protection of Human Health and the Environment

Each of the alternatives evaluated except Alternative 1: No Further Action, would provide protection of human health and the environment. Alternatives 2, 3, 4 and 5 are protective over the short-term through institutional

controls and over the long-term through active remedial measures.

Because Alternative 1: No Further Action is not protective of human health and environment, it was eliminated from consideration under the remaining evaluation criteria.

Compliance with Applicable or relevant and Appropriate Requirements (ARARs)

Under the New York regulations, the aquifer is classified as Class GA (6 NYCRR 701.18), meaning that it is designated as a potable water supply. Therefore, attaining Maximum Contaminant Levels (MCLs) for the Site contaminants established under the Safe Drinking Water Act in the groundwater is an ARAR for the Site.

Federal and state chemical-specific ARARs include the afore-mentioned MCLs (40 CFR Part 141.11-16 and 141.61-64), New York MCLs (10 NYCRR 5-1.52), and New York Groundwater Quality Standards (6 NYCRR 703) which are all enforceable standards for various drinking water contaminants (chemical-specific ARARs). If more than one such requirement applies to a contaminant, compliance with the more stringent requirement is required. Groundwater TBCs include federal secondary MCLs and groundwater quality guidance values established in the New York's Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 based on the GA groundwater classification. See Table 2, attached, which identifies the chemical-specific ARAR selected for the COCs.

No chemical-specific ARARs were identified for soil vapor COCs. Chemical-specific soil gas TBCs consist of EPA's Vapor Intrusion Screening Levels.

Each of the alternatives would comply with action-specific ARARs.

Long-Term Effectiveness and Permanence

Alternatives 2 and 3 would provide long-term protectiveness against potential exposures through the use of active groundwater and soil gas treatment. Alternative 4 would provide long-term protection against potential exposures through treatment of LNAPL, its residuals and soil. Alternatives 3b, 4c, 4d and 5b would provide an added element of long-term control of migration of impacted groundwater. All of the alternative treatment methods would provide a permanent reduction in the toxicity of the VOC contaminants. Long-term groundwater and soil gas monitoring would be required for all alternatives. All of the treatment alternatives would provide permanency with respect to the soil hot spots. Long-term effectiveness could

be affected by geologic conditions in Alternatives 2, 3, 4 and 5. Alternatives 4 and 5 would require periodic injections of amendments. Each alternative would require five-year reviews until cleanup goals are achieved.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 2 addresses contamination through extraction and treatment of groundwater, SVE, and performance monitoring. The system will reduce mobility and toxicity of contaminants, but reductions in VOC recoveries because of mass transfer limitations observed under the existing remedial system, suggest that similar results would be expected for an expanded system, thereby reducing the probability of attainment of remediation goals within a reasonable timeframe. Alternative 3a addresses contamination through air sparging, SVE systems and performance monitoring. The vapor treatment will reduce toxicity of contaminants. It will likely be more effective than Alternative 2. Achievement of remediation goals in groundwater could be complicated by a drop-off in the rate contaminants are removed with time, and the elimination of existing anaerobic biodegradation processes with the introduction of aerobic conditions into the saturated zone. Alternative 3b is comparable to 3a, but it further reduces mobility of contaminants. Alternative 4a-d would be more effective than 2 and 3a-b by addressing contamination through bioventing and performance monitoring. The toxicity of soil vapor, LNAPL and groundwater contaminants would be reduced by in-situ biodegradation processes and the vapor treatment system would reduce the toxicity of contaminants in extracted soil vapor. Treatment relies on biological degradation of contaminants rather than on processes governed by mass transfer rates. Achievement of ARARs in groundwater will still require performance monitoring of the active treatment component's effectiveness at enhancing the naturally occurring degradation processes. Alternatives 4b, 4c, 4d, 5a and 5b would optimize the naturally occurring anaerobic biodegradation in groundwater through the injection of materials that would facilitate or enhance biodegradation which would accelerate the natural biodegradation process. The vertical containment component of Alternatives 4c, 4d and 5b would further reduce future mobility of contaminants. Phytoremediation in Alternatives 4d and 5b would add protection against migration of impacted groundwater over much of the former Mattiace Property and additional hydraulic control, as well as some potential treatment of contaminants on the former Mattiace Property south of the groundwater divide. Alternatives 5a and 5b are comparable to 4b but would provide added protection against impacted groundwater on the Property and to the south and east as it would further reduce concentrations of contaminants in hot spot areas on

the former Mattiace Property through thermal treatment. The thermal component of Alternatives 5a and 5b would provide greater permanency and protection against impacted groundwater migration and increased treatment of COCs beneath the former Mattiace Property.

Alternatives 2-5 would provide a reduction in the mobility and toxicity of subsurface contaminants. Alternative 2 would achieve this through groundwater and soil vapor extraction and treatment processes while alternative 3, 4 and 5 would extract and treat solely soil vapor. Vertical containment in Alternatives 3b, 4c, 4d and 5b provide additional protection against mobility of contaminants. Alternatives 4d and 5b may also provide additional treatment and a reduction in the mobility of subsurface contaminants south of the groundwater divide through the phytoremediation system. Groundwater mounding during air sparging in Alternative 3 could cause a temporary increase in the mobility of LNAPL and impacted groundwater. Alternative 5 also would provide additional treatment and an increased level of reduced mobility of contaminants through thermal treatment of hot spots on the former Mattiace Property.

Short-Term Effectiveness

Alternatives 2, 3a-b, 4a-d, and 5a-b may have minimal short-term impacts to remediation workers, the public, and the environment associated with the implementation of the alternatives. Alternatives 2, 3a-b, 4a-d and 5a-b would require some components of the remedial systems to be located on the NCGPP. These components would require some continued access after implementation for future maintenance. Additionally, installing remedial components on the NCGPP property will adversely impact existing vegetation. Alternatives 4, 5a and 5b would reduce the extent of off-Property construction and short-term impacts to the NCGPP by using horizontally drilled bioventing wells under the Preserve property from locations on the former Mattiace Property. Each alternative can be implemented in the short-term, but long-term operation and a performance monitoring period would be required to achieve RAOs. The treatment period for Alternatives 3a-b would likely be shorter than that of Alternative 2, and the treatment period of Alternative 4a-d would likely be shorter than both 2 and 3a-b as biological degradation processes do not rely on mass transfer processes. The addition of enhanced biodegradation injections in alternatives 4b, 4c, 4d, 5a and 5b would likely further reduce the treatment period. The vertical barrier component in alternatives 3b, 4c and 4d would have an immediate impact on groundwater flow. Phytoremediation in Alternatives 4d and 5b would provide immediate results, with the effectiveness of the system increasing over time as the root system becomes more developed. The

thermal treatment associated with Alternatives 5a and 5b would have an immediate impact on the soil and groundwater concentrations in hot spots on the former Mattiace Property.

Implementability

All technologies under Alternatives 2, 3a-b, 4a-d and 5a-b are established technologies with commercially available equipment and are readily implementable. However, the design of Alternatives 3, 4 and 5 could be complicated by heterogeneous subsurface conditions. Each Alternative would require access to off-Property locations, including some clearing of portions of the adjacent NCGPP, however, the incorporation of horizontal wells in Alternatives 4a-d and 5a-b would significantly limit these impacts. The alternatives would utilize the existing soil vapor treatment system, with expansion of the SVE system as needed. Historically, electrical service has been unreliable at the Site. Alternative 3 would require significant electrical power, while Alternatives 4 and 5 would require less. Alternatives 1, 2, 4a, and 4b would not limit the implementation of other remedial actions, if they are required in the future. Alternative 3a would not limit implementation of other remedial actions unless biofouling of the formation reduces its permeability. Alternative 3b, 4c and 4d could limit the implementation of other remedial actions, as the barrier would change the hydrogeologic conditions at the Site. Additionally, the presence of trees in the southern portion of the Property as envisioned in Alternative 4d would impact the implementation of other remedial actions in that area. Alternatives 3b, 4c and 4d require additional engineering analysis during design to determine the appropriate barrier technology. Variable depth to underlying clay could complicate installation. The barrier placed close to the retaining walls on the property borders could also create geotechnical issues, and where the barrier extends off-Property, access to adjacent properties and institutional controls would be required. Alternative 4d would require maintenance of trees. Alternatives 4d, 5a and 5b require disposal of waste materials generated during system construction. Additional engineering analysis would be required to determine appropriate thermal treatment system placement for Alternative 5, but the thermal treatment would be conducted only on the former Mattiace Property, so access and impacts beyond the Property would not be an issue.

Cost

The estimated capital costs, O&M costs and present worth costs are discussed in detail in the FS Report. The cost estimates are based on the best available information. It is estimated that the O&M for Alternative 2 will be 50 years,

10 years for Alternative 3, 5 years for bioventing and 9 years for enhanced bioremediation components of Alternatives 4 and 5, and 1 year for thermal treatment component in Alternative 5. After active treatment an additional 24-50 years is estimated for performance monitoring of the effectiveness of the active components at enhancing the naturally occurring degradation processes to achieve ARARs. The costs for each of the alternatives are presented below. The highest present worth cost alternative is Alternative 3, at \$21.5 million.

Table 3: Summary of Alternatives Cost

Alternative	Capital Cost	Annual O&M Cost	Present Worth
Alternative 1	\$0	\$0	\$0
Alternative 2	\$3.2 M	\$12.2 M	\$18.5 M
Alternative 3a	\$12.8 M	\$4.4 M	\$20.7 M
Alternative 3b	\$13.4 M	\$4.4 M	\$21.5 M
Alternative 4a	\$1.7 M	\$1.1 M	\$3.3 M
Alternative 4b	\$1.7 M	\$2.7 M	\$5.2 M
Alternative 4c	\$2.3 M	\$2.7 M	\$5.9 M
Alternative 4d	\$2.5 M	\$2.7 M	\$6.2 M
Alternative 5a	\$6.09 M	\$2.1 M	\$9.8 M
Alternative 5b	\$6.0 M	\$3.3 M	\$11.2 M

State/Support Agency Acceptance

NYSDEC concurs with the preferred alternative.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and comments are evaluated. EPA will respond to the comments in the Responsiveness Summary which will be part of the ROD for the Site. The ROD is the document that formalizes the selection of the remedy for an OU or an entire site.

PREFERRED REMEDY

The Preferred Alternative represents a combination of technologies comprising the remedial alternatives developed and evaluated in the FS. It was formulated to provide a comprehensive, protective and cost-effective remedy for the Site in recognition of the Site characteristics. The EPA, in consultation with NYSDEC, recommends Alternative 5b: Bioremediation of LNAPL

through Bioventing and Enhanced Bioremediation of Groundwater, In-Situ Thermal Treatment of Soil and Groundwater Hot Spots, Partial Vertical Containment and Hydraulic Control via Phytoremediation. See attached Figure 6.

EPA expects that monitoring the performance of the active treatment components will be relied upon to achieve the remediation goals, after the active remedial components have addressed the LNAPL plume, the remaining on-Property soil hotspots and areas of groundwater with higher contaminant concentrations. These active remedial components are expected to be effective for high-concentration areas but will become less effective at reducing contaminant concentrations for low-level areas. However, these active treatment components are expected to enhance the natural attenuation processes occurring at the Site. EPA would seek to optimize the use of the active and passive components of the remedy, and would not rely upon performance monitoring until it is evident that enhanced natural attenuation would be as, or more effective, as the active components of the remedy at further reducing contaminant concentrations. Long term performance monitoring of the VOC contamination transformation resulting from the active treatment and the attenuation processes would be used to ensure that the groundwater quality improves until the performance standards identified are achieved. EPA would rely on the most current EPA MNA guidance to determine the effectiveness of the natural attenuation processes at reducing the remaining low-level concentrations to achieve ARARs in a reasonable timeframe. If the performance monitoring demonstrates that conditions would not be effective at reducing the remaining low-level concentrations in a reasonable timeframe, modifications and optimization of the enhanced bioremediation treatment component, including location, frequency and duration of bioremediation amendment injections, would be implemented followed by additional performance monitoring. An additional timeframe of 24 years is used for developing cost estimates associated with O&M activities, including well maintenance and groundwater monitoring of these additional attenuation processes.

Alternative 5b includes the following key components: discontinuance of the current groundwater pump and treat system, installation of new horizontal bioventing wells, connection of the new bioventing wells to the existing vapor treatment system, an enhanced reductive bioremediation system, in-situ thermal treatment, a partial vertical containment barrier, hydraulic control via phytoremediation to maintain water levels on the southern portion of the Property behind the barrier, performance monitoring of groundwater contamination transformation resulting from the active remedial components and the

attenuation processes to ensure groundwater quality improves until the performance standards are achieved. The estimated present worth cost of the EPA's Preferred Alternative is \$11.2 million.

The objective of the bioventing system is to remediate the residual source in groundwater, both free phase LNAPL and LNAPL in the smear zone. The bioventing system is designed and will be installed to introduce oxygen and remove carbon dioxide from the defined residual LNAPL smear zone. Horizontal extraction and vertical air inlet wells will be designed to be installed in the permeable zone at the top portion of the water table that contains the majority of the residual LNAPL and smear zones. Air is withdrawn from the vadose zone under a low vacuum, which introduces air flow from the vertical air inlet wells into the horizontal extraction wells. The air provides oxygen for microbial activity in the vadose and smear zones and accelerates the aerobic degradation of the LNAPL and residual organic COCs. The operation of the bioventing system will be designed to remove the chlorinated VOCs either as vapors with the extracted air or by dissolving them into the groundwater, where they will be degraded by anaerobic bacteria. The conditions at the Site indicate that anaerobic biodegradation is currently occurring in groundwater. The vadose zone above the groundwater would not impact these conditions significantly, as the microbes in the vadose zone above the groundwater will consume oxygen before it can diffuse into the groundwater.

The enhanced reductive bioremediation system, consisting of vertical injection wells, would be constructed both on the former Mattiace Property where thermal treatment would not address contamination and in the NCGPP areas where elevated concentrations of COC VOCs have been detected in groundwater. Vertical air inlet wells installed as part of the bioventing system would be installed to depths below the water table and also be utilized for the injection of the bioremediation amendments. The wells would be screened both above and below the water table with packers installed to seal the well from the water table during operation of the bioventing system. Additionally, temporary direct push technology (DPT) injection points would be utilized in the southern portion of the former Mattiace Property for the same purpose. Enhanced reductive bioremediation involves the injection of a carbon source, electron donors, pH buffer, or microbes, as needed, to facilitate or optimize the anaerobic degradation of hydrocarbons and chlorinated hydrocarbons in groundwater. The type of amendment, duration and frequency of injections and monitoring would be determined during design.

In-situ thermal treatment methods would be used to heat contaminated soil and nearby groundwater to very high temperatures. The heat vaporizes (evaporates) the chemicals and water changing them into gases. These vapors can move more easily through soil. The heating process can make it easier to remove NAPLs from both soil and groundwater. High temperatures would also destroy some chemicals in the area being heated. Thermal treatment would be used in "hot spot" areas of known elevated soil and groundwater contamination on the former Mattiace Property (i.e., the southeast, east, and northern portions; see Figure 5). Gasses produced by the thermal treatment will be captured with soil vapor extraction wells and treated, and off-gasses would be treated appropriately.

The partial vertical containment would be provided along the former Mattiace Property line, with the exception of the area north and west, where the depth to the underlying clay layer deepens and where NAPL is present. The type of containment system (i.e., slurry wall and/or sheet pile wall) would be determined based on further engineering analysis during design. Groundwater north of the vertical containment on the portion of the Property south of the clay mound would rise to an elevation that would cause it to flow over the clay mound to the north/northwest. By providing vertical containment along the Property line, groundwater contamination would be prevented from future migration from the general Property area in all directions, except to the northwest, where the proposed bioventing and bioremediation systems would provide treatment during and after active treatment.

Phytoremediation would be added in the southern portion of the former Mattiace Property to extract groundwater so as to provide hydraulic control of the increased water table elevation caused by the partial vertical containment barrier. The use of phytoremediation would be designed to ensure that the proposed system manages the increased water table elevation south of the groundwater divide that would result from the presence of the partial vertical containment. Wells in the southern property area could also be pumped with the existing groundwater pump and treat system if it is determined through monitoring that the trees' root systems are not sufficiently maintaining water levels. The phytoremediation system may also extract some VOC contaminants from the southern portion of the Property. Appropriate tree species would be chosen because of their robustness, ability to extract large amounts of water, rapid growth potential and water-seeking root growth.

Institutional controls that would be incorporated under the preferred alternative include the establishment of an environmental easement and a deed restriction to

document remaining soil contamination and, if necessary, the need for evaluation of vapor barriers and vapor intrusion systems for any future buildings constructed on the former Mattiace Property while contamination is still present. Institutional controls would also be required to protect the integrity of a vertical containment barrier. Institutional controls to prevent the withdrawal and use of Site-related groundwater are necessary for protectiveness in the short-term; these substantive restrictions on groundwater are already in place through existing well restriction regulations for Long Island (NY ECL 15-527) and a Nassau County ordinance prohibiting the installation of new potable wells in areas served by a public water supply. However, since the Long Island and County ordinances apply to wells with greater than 45 gallons per minute pumping capacity and does not address the potential for non-potable use of on-site groundwater, additional site-specific institutional controls limiting well installation would be required for the Property. A Site Management Plan prepared in accordance to NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation – Section 6.1 would also be required.

A restoration plan for any impacts to the Preserve would also be developed as part of the preferred alternative.

Additionally, performance monitoring would be relied upon to monitor the effectiveness of the active treatment components at enhancing the naturally occurring degradation processes in order to address low-level residual groundwater contamination, as discussed above.

The environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy¹³. This would include consideration of green remediation technologies and practices.

A long-term groundwater and surface water monitoring program would be developed and implemented to track and monitor changes in the groundwater contamination. The results from the long-term monitoring program would be used to evaluate if contaminant migration is occurring, changes in the VOC contaminants over time, and to ensure the RAOs are achieved.

While this alternative will ultimately result in reduction of contaminant levels in groundwater to levels that would allow for unlimited use and unrestricted exposure, it will take longer than five years to achieve these levels. As a result, in accordance with the EPA policy, the Site would be reviewed at least once every five years.

Basis for the Remedy Preference

Bioventing and enhanced bioremediation technologies promotes the degradation of the VOCs sorbed onto the soil particles and is not limited by the diffusion rate of the VOCs from the soil particles to the vadose zone vapors or groundwater. At this Site these technologies are anticipated to be significantly more effective than technologies that require the diffusion of the VOCs from the soil particles in order to treat the VOCs. Additionally, bioventing directly treats the LNAPL plume that extends from the former Mattiace Property under the NCGPP and acts as a continuing source to groundwater contamination.

Current conditions at the Site indicate that natural attenuation from anaerobic biodegradation is occurring in the groundwater. Enhanced bioremediation would optimize the current conditions and increase the rate at which anaerobic microbes treat contaminated groundwater.

For additional source control of the LNAPL and residual soil contamination, in-situ thermal treatment would provide a rapid reduction in the VOC concentrations in the areas of elevated contamination being treated, as well.

It is anticipated that the proposed combination of technologies would address source contamination relatively quickly compared with the other presented alternatives. Bioventing of the LNAPL plume is estimated to require approximately 5 years of operation, while thermal treatment of LNAPL on the former Mattiace property, as well as residual soil and groundwater contamination is expected to require approximately 210 days of operation, and enhanced bioremediation injections are estimated to occur during the first 9 years. These fast projected time-frames for reducing source material would then allow for naturally occurring and enhanced biodegradation processes to be more effective. After active thermal and bioremediation treatment, performance monitoring is estimated to address the remaining low levels of contamination in approximately 24 years.

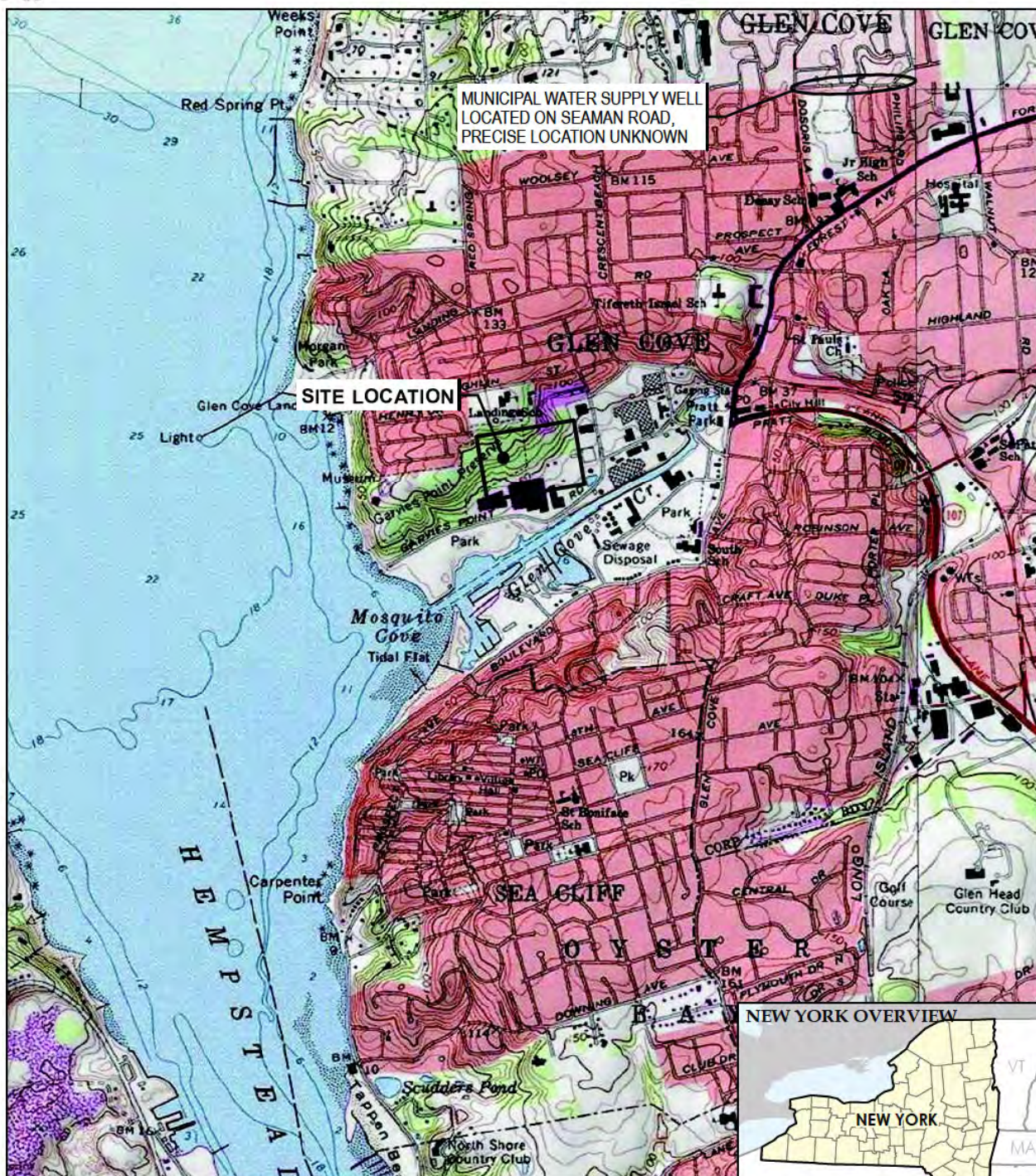
The addition of the partial vertical containment would prevent future migration of contaminants to properties east, south, and southwest during and after active remediation. The area surrounding the former Mattiace Property is currently undergoing a redevelopment process as part of an EPA-supported Brownfields project. The proposed redevelopment would include commercial and residential properties. The addition of the partial vertical containment would help to ensure that contamination does not affect the redevelopment areas.

As a result of the anticipated changes in hydrogeology after installation of the partial vertical containment system, phytoremediation is also selected to provide hydraulic control by maintaining water levels on the former Mattiace Property south of the groundwater divide. Additionally, the trees would provide some contaminant reduction in the southern portion of the Property.

The cost of the preferred remedy is projected to be significantly less than that of Alternative 2: Expansion of Dual Phase/SVE Remediation System and Alternative 3: Air Sparging. The potential impacts to the neighboring NCGPP Property are also significantly less for the preferred alternative than that of Alternatives 2 and 3 since fewer wells are required and fewer trees would be impacted.

Based on information currently available, the EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element.

TRC - GIS



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.



708 Heartland Trail
Suite 3000
Madison WI 53717
Phone 608 826 3600

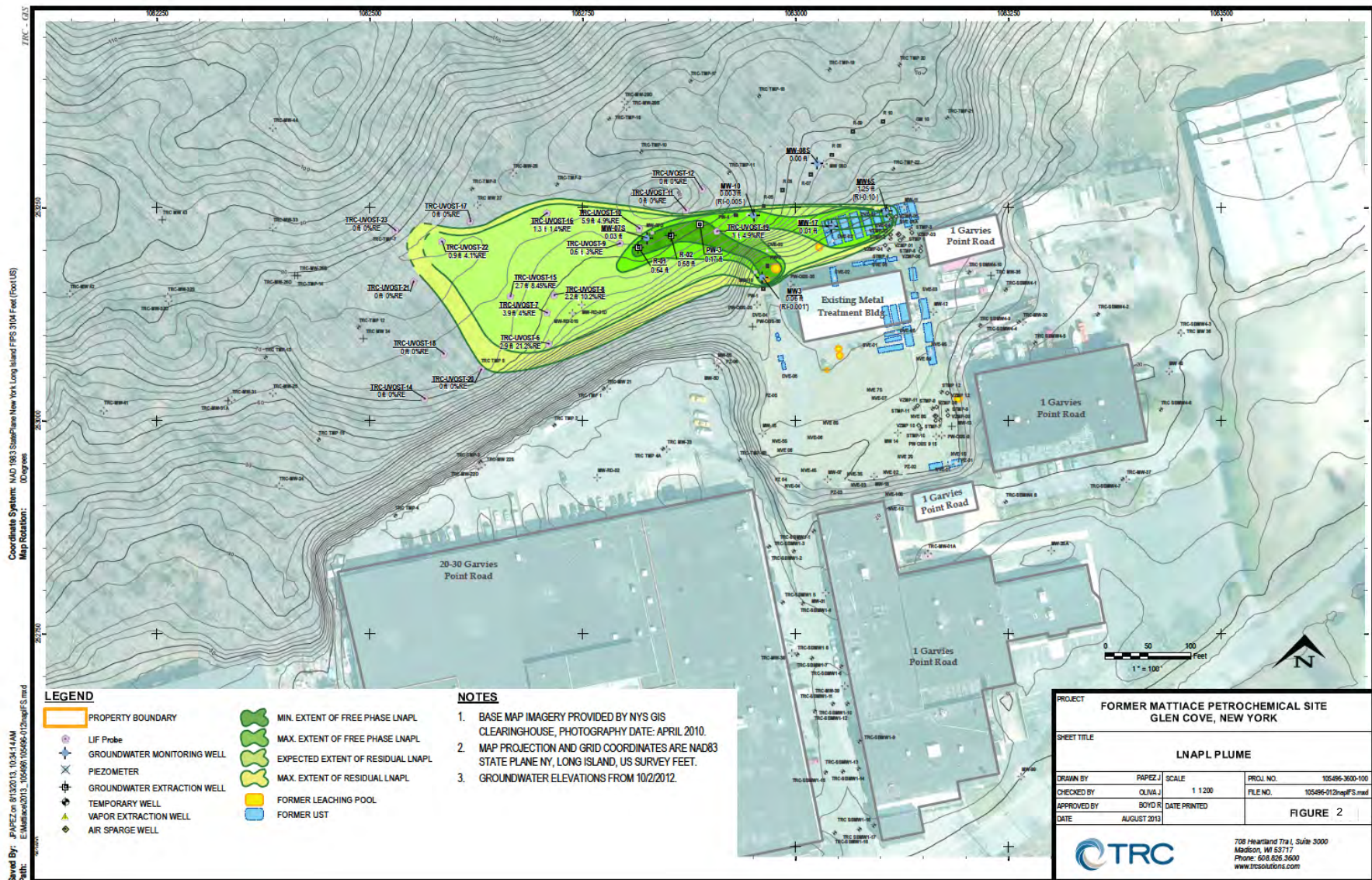
**FORMER MATTIACE PETROCHEMICAL SITE
GLEN COVE, NEW YORK**

SITE LOCATION MAP

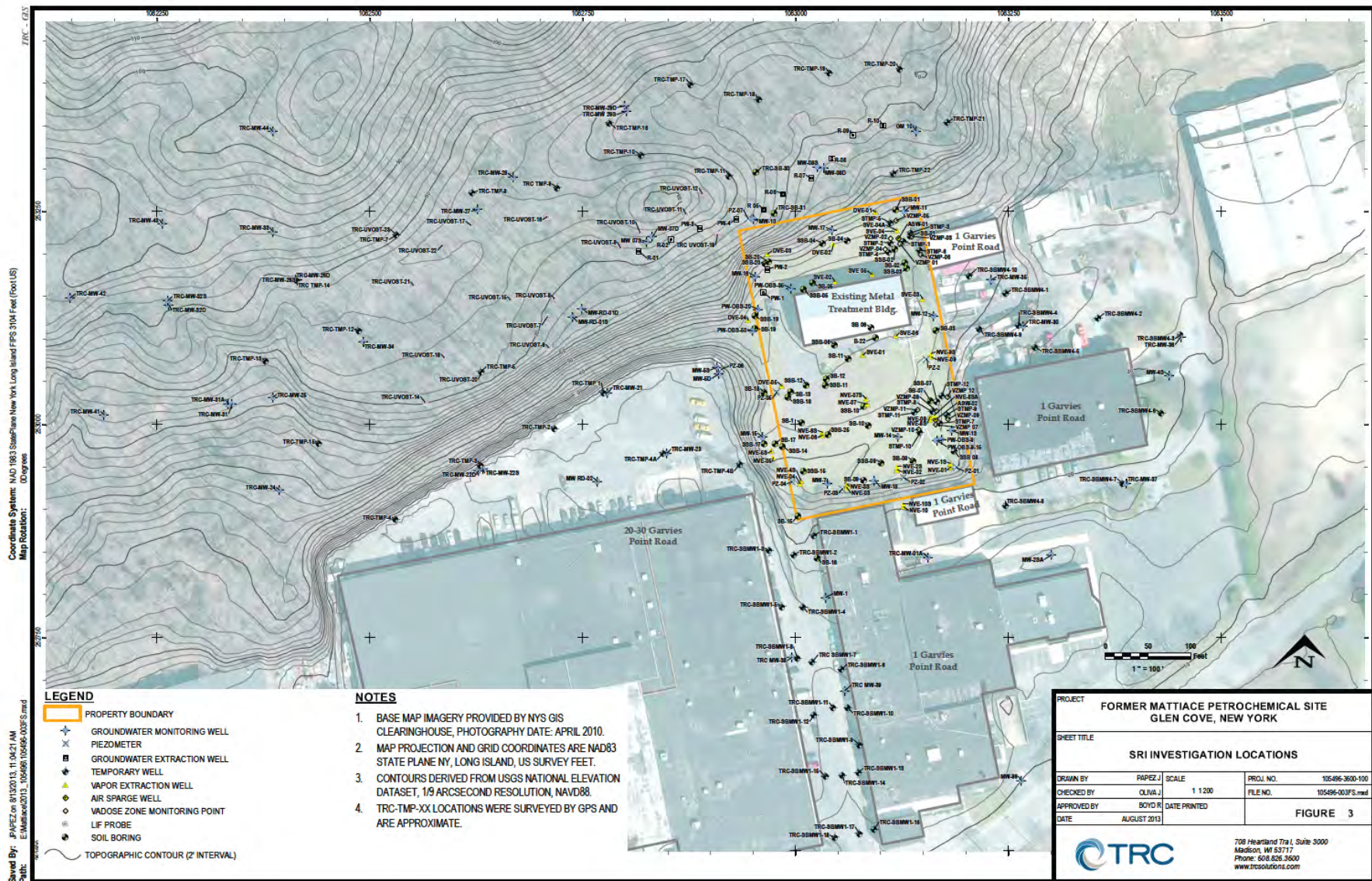
DRAWN BY:	PAPEZ J
APPROVED BY:	BOYD R
PROJECT NO:	105496-3600-100
FILE NO.	105496-001slm.mxd
DATE:	SEPTEMBER 2013

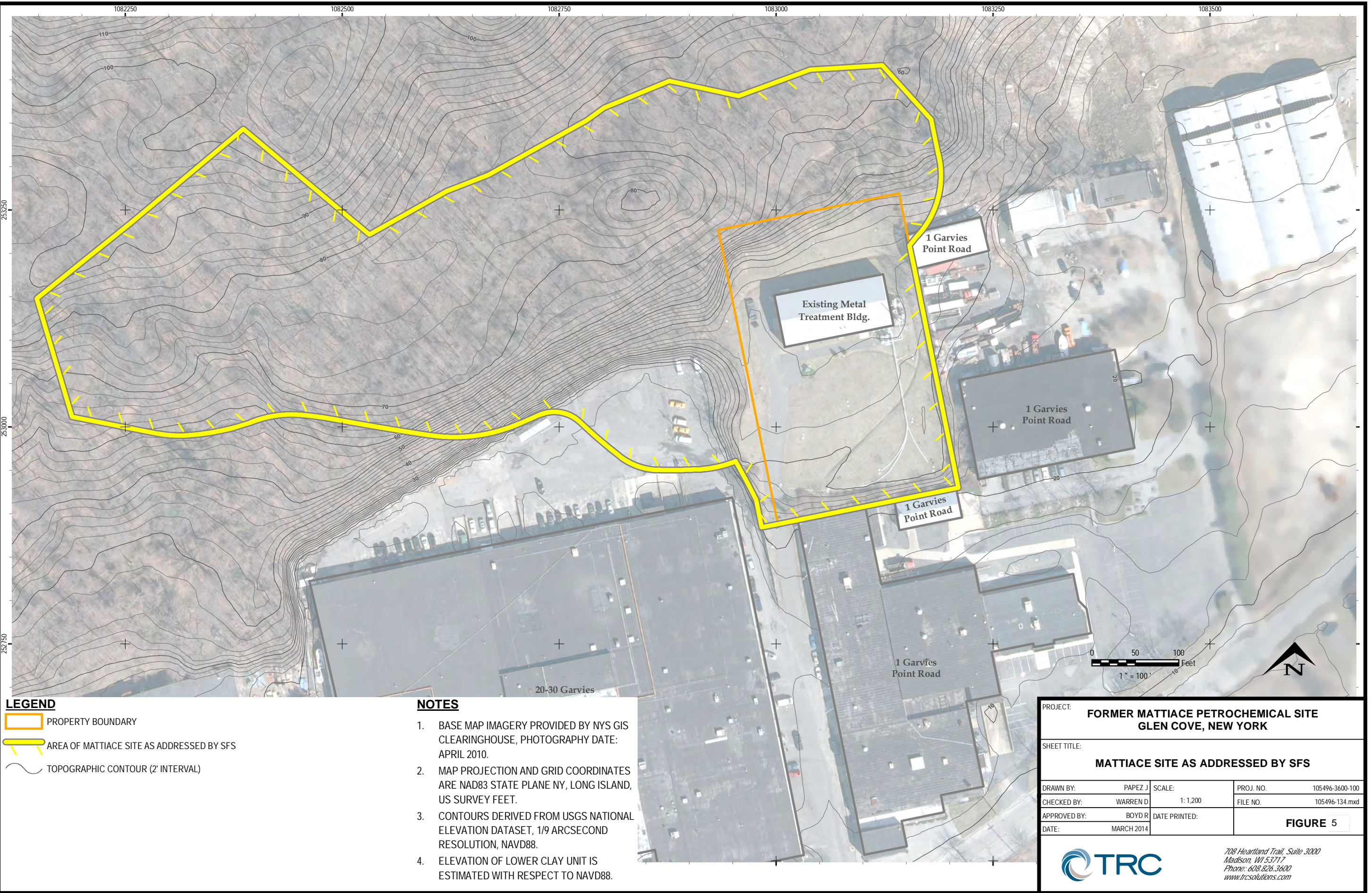
FIGURE 1

R2-0005006



R2-0005007





LEGEND

PROPERTY BOUNDARY

AREA OF MATTIACE SITE AS ADDRESSED BY SFS

TOPOGRAPHIC CONTOUR (2' INTERVAL)

- NOTES**
1.

BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
2.

MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.
3.

CONTOURS DERIVED FROM USGS NATIONAL ELEVATION DATASET, 1/9 ARCSECOND RESOLUTION, NAVD88.
4.

ELEVATION OF LOWER CLAY UNIT IS ESTIMATED WITH RESPECT TO NAVD88.

PROJECT:

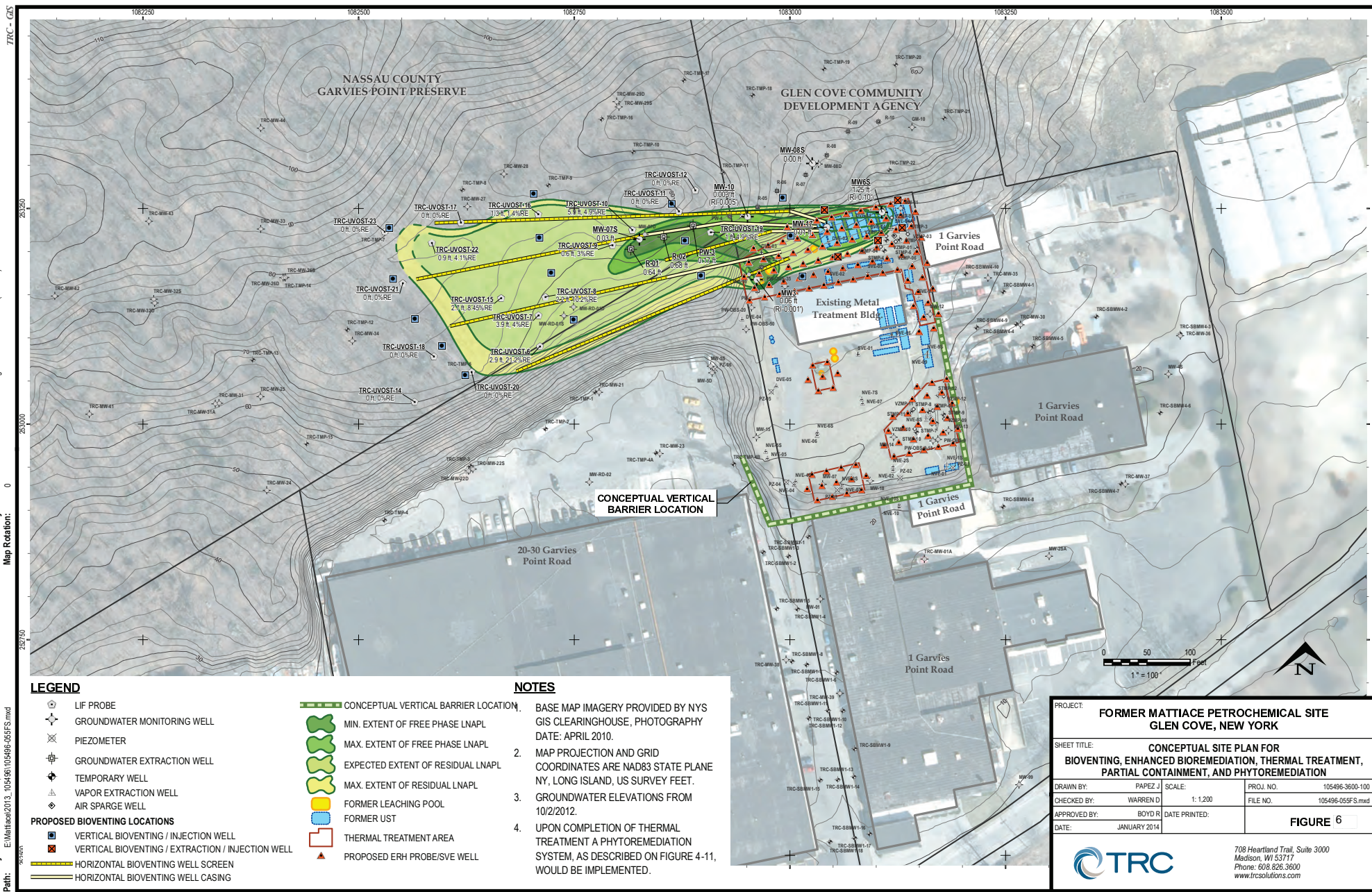
FORMER MATTIACE PETROCHEMICAL SITE
GLEN COVE, NEW YORK

SHEET TITLE:

MATTIACE SITE AS ADDRESSED BY SFS

DRAWN BY:	PAPEZ J	SCALE:	1: 1,200	PROJ. NO.	105496-3600-100
CHECKED BY:	WARREN D			FILE NO.	105496-134.mxd
APPROVED BY:	BOYD R	DATE PRINTED:		FIGURE 5	
DATE:	MARCH 2014				

708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com



LEGEND

- LIF PROBE
- GROUNDWATER MONITORING WELL
- PIEZOMETER
- GROUNDWATER EXTRACTION WELL
- TEMPORARY WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- PROPOSED BIOVENTING LOCATIONS**
 - VERTICAL BIOVENTING / INJECTION WELL
 - VERTICAL BIOVENTING / EXTRACTION / INJECTION WELL
 - HORIZONTAL BIOVENTING WELL SCREEN
 - HORIZONTAL BIOVENTING WELL CASING

NOTES

1. BASE MAP IMAGERY PROVIDED BY NYS GIS CLEARINGHOUSE, PHOTOGRAPHY DATE: APRIL 2010.
2. MAP PROJECTION AND GRID COORDINATES ARE NAD83 STATE PLANE NY, LONG ISLAND, US SURVEY FEET.
3. GROUNDWATER ELEVATIONS FROM 10/2/2012.
4. UPON COMPLETION OF THERMAL TREATMENT A PHYTOREMEDIATION SYSTEM, AS DESCRIBED ON FIGURE 4-11, WOULD BE IMPLEMENTED.

- CONCEPTUAL VERTICAL BARRIER LOCATION
- MIN. EXTENT OF FREE PHASE LNAPL
- MAX. EXTENT OF FREE PHASE LNAPL
- EXPECTED EXTENT OF RESIDUAL LNAPL
- MAX. EXTENT OF RESIDUAL LNAPL
- FORMER LEACHING POOL
- FORMER UST
- THERMAL TREATMENT AREA
- PROPOSED ERH PROBE/SVE WELL

PROJECT: FORMER MATTIACE PETROCHEMICAL SITE GLEN COVE, NEW YORK			
SHEET TITLE: CONCEPTUAL SITE PLAN FOR BIOVENTING, ENHANCED BIOREMEDIATION, THERMAL TREATMENT, PARTIAL CONTAINMENT, AND PHYTOREMEDIATION			
DRAWN BY: PAPEZ J	SCALE: 1" = 100'	PROJ. NO. 105496-3600-100	FIGURE 6
CHECKED BY: WARREN D	DATE PRINTED:	FILE NO. 105496-05FS.mxd	
APPROVED BY: BOYD R	DATE: JANUARY 2014		

708 Heartland Trail, Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600
www.trcsolutions.com

Table 1. Summary of Cancer and Non-Cancer Risks for RME Individuals

Receptor	Cancer	Non-Cancer	Drivers (>E-06 or >1)
On Site Utility Worker			
Subsurface Soil*	4E-08	4.6E-03	None
Shallow Groundwater	2E-04	6.1E+00	Multiple VOC's, BEHP
Total Utility Worker	2E-04	6.1E+00	Multiple VOC's, BEHP
On-Site Construction Worker			
Subsurface Soil*	1E-08	4.1E-02	None
Shallow Groundwater	6E-05	5.5E+01	Multiple VOC's, BEHP
Total Construction Worker	6E-05	5.5E+01	Multiple VOC's, BEHP
Future On-Site Adult Resident			
Subsurface Soil*	1E-07	1.7E-02	None
Groundwater	4E-02	4.0E+03	Multiple VOC's, 4,4'-DDD, naphthalene, DEHP, AS, Co, Cd, Fe, Mn
Soil Gas	4E-03	6.3E+02	Multiple VOC's
Total Future Adult Resident	4E-02	4.6E+03	Multiple VOC's, 4,4'-DDD, naphthalene, DEHP, AS, Co, Cd, Fe, Mn
Future On-Site Child Resident			
Subsurface Soil*	6E-07	1.6E-01	None
Groundwater	4E-02	6.4E+03	Multiple VOC's, 4,4'-DDD, naphthalene, BEHP, As, Co, Cd, Fe, MN, Ni
Soil Gas	4E-02	6.3E+02	Multiple VOC's
Total Future Child Resident	5E-02	7.0E+03	Multiple VOC's, 4,4'-DDD, naphthalene, BEHP, As, Co, Cd, Fe, MN, Ni
Future On-Site Industrial/Commercial Worker			
Subsurface Soil*	1E-07	1.7E-02	None
Groundwater	1E-02	1.1E+03	Multiple VOC's, 4,4'-DDD, BEHP, As, Co, Cd
Soil Gas	6E-04	1.5E+02	Multiple VOC's
Total Industrial/Commercial Worker	1E-02	1.3E+03	Multiple VOC's, 4,4'-DDD, BEHP, As, Co, Cd
Current Off-Site Industrial/Commercial Worker – South Commercial Property			
Groundwater (vapor intrusion)	1E-04	1.1E+00	Vinyl Chloride
Current Off-Site industrial/Commercial Worker – West Commercial Property			
Groundwater (vapor intrusion)	2E-06	1.0E-01	None
Bold	=> 1E-06 (cancer) or >1 (non-cancer)		
Bold	=> 1E-04 (cancer)		
* Below the risk range; no further action is expected.			

Table 2. Summary of Potential Chemical-Specific Groundwater ARARS and TBCs and Selected Criteria

Chemicals	Federal ARAR¹	NY ARAR and (Groundwater Quality Standards)³ and TBCs⁴	Selected Criteria
	ppb	ppb	ppb
<i>Volatile Organic Compounds</i>			
2-Butanone (MEK)	-	50	50
Chloroform	-	7	7
Cis-1,2-dichloroethene	70	5*	5*
1,2-dichlorobenzene	600	3	3
1,2-dichloroethane	5	0.6	0.6
Dichloromethane	5	-	5
Ethylbenzene	700	5*	5*
Tetrachloroethylene (PCE)	5	5*	5*
1,1,1-Trichloroethane	200	5*	5*
Trichloroethene (TCE)	5	5*	5*
Vinyl chloride	2	2	2
m,p-xylene	-	5*	5*
Xylenes	10,000	5*	5*
<i>Semi-volatile Organic Compounds</i>			
Naphthalene	-	10	10
<i>Metals</i>			
		NY MCL²	
Manganese	-	300	300

*Principal Organic Contaminant standard

- No criterion established

¹ 40 CFR Part 141.

² 10 NYCRR 5-1.

³ Groundwater Quality Standard - 6 NYCRR 703.

⁴ NYC – TBC – from Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 June 1998 last revised in 2004: Class GA Groundwater.

Attachment 2

Public Notice - Commencement of Public Comment Period



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
INVITES PUBLIC COMMENT ON THE
PROPOSED PLAN FOR THE
MATTIACE PETROCHEMICAL CO., INC. SUPERFUND SITE
GLEN COVE, NASSAU COUNTY, NEW YORK**

The U.S. Environmental Protection Agency (EPA) announces the opening of a **30-day comment period** on the Proposed Plan and preferred cleanup alternative to address contamination at the Mattiace Petrochemical Co., Inc. Superfund site in Glen Cove, Nassau County, New York. The comment period **begins on April 17, 2014 and ends on May 19, 2014**. As part of the public comment period, EPA will hold a **Public Meeting on Monday, April 28, 2014 at 7:00 PM** at the **Glen Cove City Hall, 9 Glen Street, Glen Cove, NY**. To learn more about the meeting you can contact Ms. Cecilia Echols, EPA's Community Involvement Coordinator, at 212-637-3678 or 1-800-346-5009 or visit our website at www.epa.gov/region2/superfund/npl/mattiace

The Mattiace Petrochemical Co., Inc. Superfund site is listed on the Superfund National Priorities List. The primary objective of this Proposed Plan is to present an Amendment to the 1991 Record of Decision and present a change in remedy for the soil gas and groundwater remedy and to address the light non-aqueous phase liquid (LNAPL) plume. The remediation goal of the 1991 ROD was to reduce to acceptable levels the on-site potential health effects associated with contaminated soils and residual leakage from underground tanks; minimize the off-site migration of contaminated groundwater and surface runoff to potential environmental receptors; and restore the groundwater currently being degraded as a result of the site to its most beneficial use.

EPA now seeks to amend the 1991 ROD to implement a **Bioremediation of LNAPL and Groundwater with In-Situ Thermal Treatment of Soil and Groundwater Hotspots, Partial Vertical Containment and Hydraulic Control via Phytoremediation remedy**.

Components of the preferred cleanup alternative include:

- Discontinuance of the current groundwater pump and treat system,
- Installation of new horizontal bioventing wells,
- Connection of the new bioventing wells to the existing vapor treatment system,
- An enhanced reductive bioremediation system,
- In-situ thermal treatment for soil and groundwater hotspots on the Property,
- A partial vertical containment barrier,
- Hydraulic control via phytoremediation to maintain water levels on the southern portion of the Property behind the barrier, and
- Performance monitoring of groundwater contamination transformation resulting from the active remedial components and the attenuation processes to ensure groundwater quality improves until the performance standards are achieved.

During the **Monday, April 28, 2014 Public Meeting**, EPA representatives will be available to further elaborate on the reasons for recommending the preferred cleanup alternatives and public comments will be received.

The Remedial Investigation Report, Feasibility Study Report, Risk Assessment, Proposed Plan and other site-related documents are available for public review at the information repositories established for the site at the following locations:

Glen Cove Public Library: 4 Glen Cove Ave, Glen Cove, New York 11542 Telephone: (516) 676-2130
Hours: Monday – Thursday: 9am - 9pm, Friday: 9am - 5pm, Saturday: 9am -5pm, Sunday: 1pm - 5pm

USEPA Region 2: Superfund Records Center, 290 Broadway, 18th Floor, New York, NY 10007-1866,
Telephone: (212) 637-4308 Hours: Mon. - Fri., 9am - 5pm

EPA relies on public input to ensure that the selected remedy for each Superfund site meets the needs and concerns of the local community. It is important to note that although EPA has identified a preferred cleanup alternative for the site, no final decision will be made until EPA has considered all public comments received during the public comment period. EPA will summarize these comments along with EPA's responses in a Responsiveness Summary, which will be included in the Administrative Record file as part of the Record of Decision.

Written comments and questions regarding the Mattiace Petrochemical Co., Inc. Superfund site, postmarked no later than May 19, 2014 may be sent to: Ms. Ashley Wiedemer, Remedial Project Manager, U.S. Environmental Protection Agency, 290 Broadway, 20th Floor, New York, New York 10007-1866, or faxed to (212) 637-3966, or emailed to wiedemer.ashley@epa.gov.

Attachment 3

April 28 2014 Public Meeting Sign-In Sheets

Attachment 3

April 28 2014 Public Meeting Sign-In Sheets



Mattiace Petrochemical Co., Inc. Superfund Site
Public Meeting – Monday, April 28, 2014 @ 7:00pm
Glen Cove Town Hall
Main Chambers
9 Glen Street, Glen Cove, New York 11542

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Representing
Heide Marie Duden	NYSDEC - DER	hmduden@ecw.dec.state.ny.us	DEC
NATHAN WALZ	NYS DOH - ALBANY	nmwalz@health.state.ny.us	NYS DOH
JEFF CHRISTODOULOS	CITY HALL 9 Glen St. GC	zchristopoulos@cityofglen Cove.ny.us	MAYOR SPINELLO
MARK LASEIN	CBT 200 Horizon Center TRENTON NJ 08641	mark.lasein@CBT.com	CBT
R. Spinello	40 G.C. City Hall		



Mattiace Petrochemical Co., Inc. Superfund Site
Public Meeting – Monday, April 28, 2014 @ 7:00pm
Glen Cove Town Hall
Main Chambers
9 Glen Street, Glen Cove, New York 11542

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Representing
James B Harrington	625 BROADWAY ALBANY NY	JBHARRIN @ G.W. DEC. STATE. NY. US	NYSDEC
Gerard Burke	"	gwburke@gw.dec- state.ny.us	NYSDEC
Daniel Warren	11 Carter St Andover, CT 06232	dhwarren@gmail.com	
Sarah Moon	"	Sarahmoon@gmail.com	
Ellis Koch	522 Bardini Drive Melville NY 11747	ellis.koch@gmail.com	RXR Glen Isle



Mattiace Petrochemical Co., Inc. Superfund Site
Public Meeting – Monday, April 28, 2014 @ 7:00pm
Glen Cove Town Hall
Main Chambers
9 Glen Street, Glen Cove, New York 11542

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Representing
JOSEPH MENDITI	9371 GLEN ST. AVE, BEAUMONT, NY	JMENDITI@PETROCHEM.COM	
MARTY NORMANDIA	47 Buckeye Rd	—	Garvies Preserve/Audubon
Beth Ann Drexler	20 Sunset La.		
Pam Panzenbeck	62 Dosoris La	Ppanzenbeck@cityofglen Cove.org	City Council
Shan Howard, Jr	18 Southfield Rd Glen Cove	VZE2FN5V@verizon.net	Chamber of Commerce Rotary Inc.

Attachment 4

April 28, 2014 Public Meeting Transcript

2 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
3 REGION II

4 -x

5 MATTIACE PETROCHEMICAL CO., INC.

6 SUPERFUND SITE PUBLIC MEETING

7 -x

8 Glen Cove City Hall
9 9 Glen Street
10 Glen Cove, New York

11 April 28, 2014
12 7:00 p.m.

13

14

15 A P P E A R A N C E S:

16

17 SAL BADALAMENTI,
18 Chief, Eastern NY Remediation Section

19

20 CECILIA ECHOLS,
21 Community Involvement Coordinator

22

23 MARIAN OLSEN,
24 Health Risk Assessor

25

ASHLEY WIEDEMER,
Remedial Project Manager

26

27

28

29

30

1 Mattiace Petrochemical

2 MS. ECHOLS: Good evening.

3 Tonight's meeting is to address
4 the concerns of the community
5 about the Mattiace Petrochemical
6 Superfund Site and for us to give
7 a proposed plan of action.

8 But before we get into the
9 agenda, the Mayor of Glen Cove has
10 a few comments for you.

11 MAYOR SPINELLO: Good
12 evening, everyone.

13 Tonight the EPA, in
14 conjunction with the DEC, is here
15 tonight to give an update on the
16 Mattiace property. As you're well
17 aware, the Mattiace property is
18 located by the waterfront; not on
19 the waterfront, but it's a parcel
20 that's obviously of significant
21 interest to all of us.

22 The original remediation
23 plan, they've done some work, and
24 now it's been revised. They'll
25 present it to you.

1 Mattiace Petrochemical

2 We also have here Ellis from
3 the redeveloper.

4 Although this is not a
5 waterfront parcel, I know there
6 will be questions, although they
7 are just talking about the
8 remediation of this particular
9 parcel.

10 So, I'm glad all of you are
11 here, and I'll turn it over to
12 them, and thank you for coming.

13 My staff and I were given a
14 presentation today on the project,
15 and I'm sure you'll be pleased
16 with what you hear.

17 Thank you.

18 MS. ECHOLS: Thank you.

19 First, I would like to thank
20 the Town of Glen Cove for allowing
21 us to have the public meeting
22 here.

23 And the purpose of this
24 session is to update the community
25 about current activities at the

1 Mattiace Petrochemical
2 site and to solicit comments
3 regarding the amendment to the
4 1991 Record of Decision and
5 present a change in remedy for the
6 soil, gas, and groundwater
7 remedies, and to address the light
8 nonaqueous phase plume.

9 I'm Cecilia Echols. On the
10 agenda speaking today is Salvatore
11 Badalamenti, Ashley Wiedemer, and
12 Marian Olsen, Risk Assessor, if
13 need be.

14 We also have with us members
15 from the New York State DEC, Heidi
16 Dudek, Jim Harrington, Gerard
17 Burke; from the New York State
18 Department of Health, Nate Watz;
19 and from Glen Cove, Ellis Koch.

20 Thank you all.

21 We mailed out about 150
22 postcards to the community, and
23 the public notice was placed in
24 the Glen Cove Pilot Record and it
25 was also posted on the Glen Cove

1 Mattiace Petrochemical
2 Townhall website.

3 We have copies of the
4 Powerpoint presentation. I don't
5 know if anyone would like -- we
6 have a few up here, if you would
7 like to take one home. It was
8 also placed on our website today
9 around 3 o'clock.

10 We have an information
11 repository -- two; one at Glen
12 Cove Public Library, and EPA's New
13 York office in Manhattan.

14 I hope that everyone has had
15 a chance to sign in and has taken
16 a copy of the Proposed Plan. And
17 we will have all questions at the
18 end of the presentation.

19 We have Ashley speaking now.

20 Oh, I'm sorry, Sal.

21 MR. BADALAMENTI: I just
22 want to give a little introduction
23 of the site being addressed under
24 CERCLA Superfund Law.

25 CERCLA was passed by

1 Mattiace Petrochemical
2 Congress in 1980. It's intended
3 to clean up hazardous waste sites
4 and provide funding to clean up
5 those sites. It also empowers EPA
6 to ask Responsible Parties to
7 clean up the sites.

8 In this case, the Mattiace
9 site, it has been addressed
10 through the Responsible Parties
11 that have taken over the
12 responsibility for the long-term
13 operation and maintenance of the
14 existing remedy and are likely to
15 continue in the future with the
16 new remedy that's being proposed
17 tonight.

18 The Superfund sites get
19 ranked and they get evaluated for
20 how much of a hazard they could
21 possibly cause, and they get
22 placed on a National Priorities
23 List. And EPA will either clean
24 up those sites or have Responsible
25 Parties do the cleanups. The

1 Mattiace Petrochemical
2 Mattiace site was added to the
3 National Priorities List in March
4 of 1989.

5 The Superfund process
6 normally addresses two different
7 pathways: If it's an immediate
8 public health risk, EPA will step
9 in with its emergency response
10 teams and take immediate action to
11 stabilize situations; and in cases
12 where it's a longer term remedy,
13 it will take a closer look at the
14 extent of the problem and evaluate
15 alternatives and select an
16 alternative, like we're doing here
17 tonight, and that results in a
18 longer term action.

19 So, with that, I'll leave
20 the particulars for the Mattiace
21 Petrochemical site to Ashley.

22 We know there's going to be
23 a lot of technical information
24 provided tonight. We'll try to
25 clarify as much as possible and

1 Mattiace Petrochemical
2 try to keep it in laymen's terms
3 as much as possible.

4 MS. ECHOLS: Does anyone
5 need a copy of the Powerpoint
6 presentation?

7 MS. WIEDEMER: So, we are
8 here to discuss the Mattiace
9 Petrochemical Company.

10 UNIDENTIFIED: Do you have a
11 microphone?

12 MS. WIEDEMER: I don't, I'm
13 sorry. I'll try and speak louder.

14 This figure here shows the
15 site location. The site's located
16 in Nassau County, Glen Cove, on
17 the North Shore of Long Island.

18 A little bit of the site
19 history. In the 1980s, New York
20 State conducted investigation
21 which led to the site being listed
22 on the National Priorities List in
23 1989.

24 Once the site was listed,
25 between 1989 and 1991 EPA

1 Mattiace Petrochemical
2 conducted additional
3 investigations which led to the
4 1991 Record of Decision, which
5 selected a groundwater pump and
6 treat and soil vapor extraction
7 system as the remedy for the
8 contamination found at the site.

9 In 2003, EPA entered into a
10 Consent Decree with the
11 Responsible Parties to implement
12 that remedy.

13 As a result of the remedial
14 system, in 2010, DEC, EPA, and the
15 Responsible Parties agreed that
16 the current remedy was no longer
17 reducing contaminant
18 concentrations in a reasonable
19 timeframe so it might be best to
20 look at alternative approaches.

21 So, from there, a
22 Supplemental Remedial
23 Investigation and Feasibility
24 Study was conducted.

25 The purpose of the Remedial

1 Mattiace Petrochemical
2 Investigation is to determine the
3 nature and content of the
4 contamination and to identify if
5 any health risks are there. Then
6 a Feasibility Study is done to
7 evaluate the different options for
8 cleaning up the contamination
9 found at the site.

10 So, during the Remedial
11 Investigation for the Mattiace
12 site, a total of eighteen
13 ultraviolet optical screening tool
14 laser-induced fluorescence points
15 and six soil borings were
16 installed, and these were used to
17 define the limits of the light
18 nonaqueous phase liquid plume.

19 Additionally, there were 52
20 soil borings with temporary
21 monitoring points installed and 28
22 new groundwater wells installed
23 that would screen in the shallow
24 and deep aquifers.

25 This figure here shows the

1 Mattiace Petrochemical
2 investigation locations. A lot of
3 the investigation locations seen
4 on the property and immediately
5 off the property were done in the
6 past, but you can see how far out
7 we have extended during this
8 Remedial Investigation.

9 There were three rounds of
10 groundwater sampling conducted
11 between November of 2011 and
12 February of 2013, and in each of
13 the rounds, the samples were
14 analyzed for the following
15 parameters (indicating).

16 A conceptual site model was
17 developed and integrates all the
18 different types of information
19 that we collected. So, one thing
20 that we found was the -- there was
21 a clay mound that runs east-west
22 along the property, and this
23 creates a groundwater divide. So,
24 the groundwater that's to the
25 north of the divide flows in the

1 Mattiace Petrochemical
2 northwest direction and south of
3 the divide flows south, towards
4 Glen Cove Creek.

5 UNIDENTIFIED: I'm sorry,
6 where's the divide?

7 MS. WIEDEMER: It's the
8 orange.

9 UNIDENTIFIED: I see.

10 MS. WIEDEMER: And this
11 figure here shows the light
12 nonaqueous phase liquid plume that
13 we found during the investigation.
14 The darker shades identify free
15 phase LNAPL, which is
16 basically -- it's floating on top
17 of the water table.

18 And the lighter shade of
19 green is residual phase LNAPL,
20 which means it gets stuck between
21 the soil particles during water
22 fluctuations and water table
23 elevation.

24 And this figure here shows
25 the extent of groundwater

1 Mattiace Petrochemical
2 contamination. This is for
3 benzene, toluene, ethylbenzene,
4 and xylene, better known as BTEX.
5 You can see here that it extends
6 approximately seven hundred feet
7 to the west of the property. It's
8 under the Garvies Point Preserve.

9 The focus of this proposed
10 plan is to amend the Record of
11 Decision for the groundwater pump
12 and treat and SVE system.

13 The remediation areas to be
14 addressed are the hot spots on the
15 former Mattiace property, the
16 LNAPL plume that was shown in the
17 figure before, and the groundwater
18 plume on the property and north of
19 the divide.

20 So, this figure here shows
21 the extent of the area that we are
22 addressing under this Proposed
23 Plan.

24 Once all the data is
25 collected, EPA conducts a Health

1 Mattiace Petrochemical
2 Risk Assessment to determine if
3 there's any current or future risk
4 that might be associated with the
5 contamination found.

6 The risk assessment
7 identified that site-related
8 contaminants, including BTEX and
9 volatile organic compounds, were
10 above the risk range in the soil
11 gas and groundwater and pose an
12 unacceptable risk to future and
13 current users.

14 An ecological risk
15 assessment was also performed, and
16 there were no ecological risks
17 identified.

18 Now, based on the risk
19 assessment and the investigation,
20 EPA developed remedial action
21 objectives for the site in order
22 to protect human health and the
23 environment.

24 These are the remedial
25 action objectives that were

1 Mattiace Petrochemical
2 developed for the site: They are
3 to reduce the risk of human health
4 associated with potential
5 ingestion, dermal contact, and
6 inhalation of volatile organic
7 compounds in groundwater to
8 acceptable levels; prevent the
9 LNAPL from acting as a continuing
10 source of groundwater and soil gas
11 contamination; and restore the
12 impacted aquifer to its most
13 beneficial use, as a source of
14 drinking water, by reducing
15 contaminant levels to the federal
16 and state maximum contaminant
17 levels on the former Mattiace
18 property and north of the
19 groundwater divide.

20 So, as a result of all the
21 investigations and during the
22 Feasibility Study, five
23 alternatives were proposed. I'm
24 going to discuss them in further
25 detail one-by-one.

1 Mattiace Petrochemical

2 Each remedy does include
3 common elements, and they are the
4 geospatial location, which is the
5 area being addressed seen in the
6 figures earlier;

7 Each remedy is going to
8 contain groundwater and soil gas
9 monitoring. So, a monitoring
10 program will be developed that
11 will identify any changes in
12 groundwater quality or if
13 groundwater restructuration is
14 achieved;

15 Institutional controls will
16 be developed. They will be in
17 forms of environment easements or
18 deed notices and they will be
19 required for any -- the need for
20 vapor barriers or vapor intrusion
21 systems or groundwater
22 restrictions;

23 Natural attenuation
24 processes is another common
25 element. Each alternative will

1 Mattiace Petrochemical
2 include monitoring for the effects
3 of the active remedial components
4 on the natural attenuation
5 processes that are occurring;

6 And hot spot soil
7 excavation. So, if any of the
8 activity components do not address
9 the on-property soil hot spots,
10 excavation may be required;

11 And preserve restoration.
12 Since the site is so close to the
13 preserve, there may be some
14 construction and installation of
15 wells that may need to be on the
16 property, and a restoration plan
17 will be developed during design in
18 order to mediate any of those
19 effects.

20 So, the first alternative
21 proposed was the no further
22 action. This would just really
23 require shutting down the current
24 system, not placing any
25 institutional controls, and

1 Mattiace Petrochemical
2 contaminated soil and gas would
3 remain on the property.

4 Remedial Alternative 2 is to
5 expand the existing groundwater
6 pump and treat system. So, keep
7 the current system, but add
8 additional groundwater extraction
9 wells and connect them to the
10 existing treatment system.

11 The third alternative
12 includes air sparging. So, there
13 are a couple of subcomponents.

14 3A is air sparging alone;
15 basically, injecting air to remove
16 any volatile contaminants, and
17 then the vapors that are produced
18 from that will be eject -- they
19 will be treated with a soil vapor
20 extraction system.

21 Then 3B adds a partial
22 vertical containment barrier to
23 the air sparging system. The
24 partial vertical containment
25 barrier will consist of a slurry

1 Mattiace Petrochemical
2 wall or sheet barrier wall and
3 will be installed around the
4 western -- the eastern, the
5 southern, and the southwestern
6 portion of the property. The
7 barrier would limit the future
8 migration away from the former
9 Mattiace property during and after
10 remedy implementation.

11 Alternative 4 is
12 bioremediation.

13 Alternative 4A is bioventing
14 alone. Bioventing involves a
15 vacuum-induced flow of air into
16 the subsurface that facilitates by
17 degradation in order to treat the
18 contaminants. And, again, the
19 vapors would be extracted and
20 treated. The extraction wells
21 would be horizontal extraction
22 wells, so they would go underneath
23 the preserve.

24 Alternative 4B is the
25 bioventing system that would be

1 Mattiace Petrochemical
2 used on the LNAPL plume with the
3 addition of enhanced
4 bioremediation. Enhanced
5 bioremediation would be the
6 injection of some sort of nutrient
7 or other chemical that would
8 enhance the natural degradation
9 processes that are occurring in
10 the groundwater.

11 And Alternative 4C is the
12 bioventing with the enhanced
13 bioremediation and the partial
14 vertical containment described in
15 Alternative 3B.

16 And Alternative 4D also adds
17 a hydraulic control component in
18 the form of phytoremediation.
19 Phytoremediation would use trees
20 and their root system in order to
21 provide hydraulic control of the
22 increased water table elevation
23 caused by the vertical barrier.

24 The next alternatives were
25 Alternative 5. So, 5A is the

1 Mattiace Petrochemical
2 bioventing system with the
3 enhanced phytoremediation
4 described just before, but it also
5 adds in-situ thermal treatment.
6 The in-situ thermal treatment
7 would be used on known groundwater
8 and soil hot spots on the former
9 Mattiace property. The subsurface
10 would be heated, vaporizing the
11 contaminants in the soil and
12 groundwater, and then these vapors
13 would be collected and treated.

14 Then Alternative 5B includes
15 the partial vertical containment
16 barrier and the hydraulic control
17 component described earlier.

18 So, during the evaluation of
19 all the remedial alternatives
20 presented, each alternative is
21 assessed through nine evaluation
22 criteria listed, and they are
23 listed here: Overall protection
24 of human health and the
25 environment; compliance with

Mattiace Petrochemical

applicable and relevant and
appropriate requirements; long-
term effectiveness and permanence;
reduction of toxicity, mobility,
and volume; short-term
effectiveness; implementability;
cost; state acceptance; and
community acceptance.

So, after the evaluation of
the alternatives with the nine
criteria, EPA's preferred remedial
alternative is Alternative 5B, the
bioremediation of the LNAPL
through a bioventing and enhanced
phytoremediation of the
groundwater, in-situ thermal
treatment of soil and groundwater
hot spots, and partial vertical
containment with hydraulic control
via phytoremediation.

So, the figure here shows
where each component is proposed
to be. The green here is where
the partial vertical containment

1 Mattiace Petrochemical
2 wall is proposed, the red areas
3 are where the thermal treatment is
4 proposed, and there are some
5 yellow horizontal extraction wells
6 that would be installed for the
7 treatment of the LNAPL plume; and
8 then there are approximately
9 fifteen air injection holes that
10 would also be used for the
11 enhanced phytoremediation
12 injections.

13 So, many factors went into
14 the basis for the preferred
15 remedy. Alternative 5B would
16 rapidly reduce the soil and
17 groundwater contamination on the
18 former Mattiace property through
19 the thermal treatment;

20 Bioventing would provide
21 direct treatment of the LNAPL
22 beneath the Garvies Point Preserve
23 in order to eliminate the ongoing
24 source;

25 The bioventing system would

1 Mattiace Petrochemical
2 minimize the impact to the Garvies
3 Point Preserve through the use of
4 the horizontal extraction wells;

5 Bioventing would be able to
6 degrade the contaminants sorbed to
7 the particles, and the processes
8 would not be limited by the
9 diffusion rate;

10 And the enhanced
11 phytoremediation will optimize the
12 current conditions and accelerate
13 the rate at which the microbes can
14 treat the groundwater;

15 And the incorporation of the
16 partial vertical containment
17 barriers would limit the future
18 migration of contaminants during
19 and after the remedy, the
20 remediation, which could
21 potentially benefit the
22 redevelopment;

23 And the preferred
24 alternative will also incorporate
25 green technology.

1 Mattiace Petrochemical

2 During the FS, there's a
3 cost comparison done for all the
4 alternatives, and you can see them
5 here.

6 So, 3A was the air sparging,
7 and that was the most expensive.
8 And down at the bottom is our
9 preferred alternative at \$11.2
10 million.

11 So, the next steps in the
12 process are to finalize the
13 decision and make the Record of
14 Decision, which describes the
15 selected remedy that EPA will
16 select after hearing all public
17 comments.

18 The public comments will be
19 addressed in a Responsiveness
20 Summary, which will become part of
21 the Record of Decision.

22 And once the Record of
23 Decision is final, a remedial
24 design will begin, followed by the
25 remedial action or the

1 Mattiace Petrochemical
2 implementation of the selected
3 remedy.

4 So, written comments and
5 additional information can be
6 directed to me. My information is
7 here; if you have a copy of the
8 presentation, it's there; or it
9 can be found on the website.

10 And documents related to the
11 site can be found at the local
12 repositories; the one is at the
13 Glen Cove Public Library, or in
14 New York City at the EPA Superfund
15 Records Center.

16 General inquiries can be
17 made to Cecilia, and additional
18 information is on the website.

19 So, now we are going to open
20 the floor to any questions.

21 MS. ECHOLS: We have a
22 stenographer here.

23 Would you please state your
24 name?

25 Stand up and state your

1 Mattiace Petrochemical
2 name, please, so she can record
3 it.

4 MS. SLEZAK: I'm Grace
5 Slezak, S-L-E-Z-A-K.

6 How many acres is the total
7 property at Mattiace?

8 MS. WIEDEMER: About two;
9 1.9.

10 MS. SLEZAK: How much?

11 MS. WIEDEMER: 1.9 acres.

12 MS. SLEZAK: Only 1.9 acres.

13 MS. WIEDEMER: The actual
14 property itself. But the site
15 extends beyond the property
16 boundaries.

17 MS. SLEZAK: Extends how
18 far?

19 MS. WIEDEMER: Approximately
20 seven hundred feet from it, from
21 the edge of the...

22 MS. SLEZAK: Because that
23 green area appears to be a greater
24 amount of land than what you --

25 MS. WIEDEMER: Yeah, this

1 Mattiace Petrochemical
2 here is the property boundaries,
3 so in here is about 1.9 acres.
4 And this is just where the LNAPL
5 is found.

6 Groundwater contamination
7 extends out a bit further than
8 that, and the end of the
9 groundwater contamination is
10 approximately seven hundred feet
11 from the corner of the property
12 boundary here.

13 MS. SLEZAK: Does it have a
14 continuous lot line with the
15 waterfront property?

16 MS. WIEDEMER: No.

17 Well --

18 MS. SLEZAK: The waterfront
19 redevelopment property, where the
20 apartment buildings will be built,
21 is there a contiguous -- is this a
22 contiguous parcel?

23 MS. WIEDEMER: It is.

24 I have a further zoomed-out
25 version. Hold on.

1 Mattiace Petrochemical

2 There we go. So, there you
3 can see the area in yellow is the
4 area that we are going to be
5 addressing. So, here's the creek,
6 and along here is where it goes up
7 here, and around here.

8 MS. SLEZAK: And someplace
9 it says the former Mattiace
10 property.

11 MS. WIEDEMER: It's the
12 former Mattiace property. No one
13 really --

14 MS. SLEZAK: Who's the
15 current owner?

16 MS. WIEDEMER: EPA?

17 There really is no owner.
18 The company went bankrupt and now
19 we're -- I don't know.

20 MS. SLEZAK: Isn't there an
21 owner of record?

22 MR. BADALAMENTI: I'm not
23 certain at this point.

24 MS. SLEZAK: Who's paying
25 for the cleanup?

1 Mattiace Petrochemical

2 MS. WIEDEMER: The

3 Responsible Party.

4 MS. SLEZAK: Well, who's the

5 Responsible Party?

6 MR. BADALAMENTI: The

7 Responsible Party is a group

8 that's been hired by the

9 Responsible Party. It's TRC
10 Companies.

11 MS. SLEZAK: Is the

12 Responsible Party, then,

13 equivalent to the owner of the
14 property?

15 MR. BADALAMENTI: Right now,

16 I'm not sure if the old Mattiace

17 family is still part owner or not

18 part owner.

19 MS. SLEZAK: How will you

20 know who to bill?

21 MS. WIEDEMER: The

22 Responsible Party is --

23 MS. SLEZAK: Who is the

24 Responsible Party?

25 MS. WIEDEMER: Well, it was

1 Mattiace Petrochemical
2 the Mattiace Corporation and there
3 were a bunch of other additional
4 small companies, but then their, I
5 guess, contractor assumed
6 liability for the site.

7 MS. SLEZAK: Did someone buy
8 the property?

9 MS. WIEDEMER: No.

10 I don't know how to explain.

11 MR. BADALAMENTI: Are you
12 the owner?

13 MR. LLOYD: Raymond Lloyd,
14 TRC.

15 The Mattiace property,
16 because of the releases that
17 occurred in the eighties, went
18 into -- the firm, parent, holding
19 company, all went into bankruptcy
20 filing.

21 As part of it, the DEC and
22 EPA came in and initiated the
23 initial work. After they did the
24 initial assessment and began the
25 remedy, which EPA did, they also

1 Mattiace Petrochemical
2 at that time went and looked for
3 what are called Responsible
4 Parties, which can also be
5 numerous businesses that did
6 business with the Mattiace. There
7 are probably a hundred RPs that
8 contributed some amount of money
9 to the funds, whereas a group of
10 RPs are paying to remediate.

11 They contracted with us to
12 be the lead party to kind of move
13 things through and do the work
14 there. The property does not
15 belong to anyone. It went through
16 the bankruptcy.

17 EPA, because of the work
18 they did, then gets lien rights to
19 recover any money against it. So,
20 as of now, there's not really a
21 property owner. It's in Limbo.

22 There are some subtleties
23 which you can look up with regard
24 to the Superfund law and if you
25 own the property you become an RP.

1 Mattiace Petrochemical

2 So, no one particularly wants to
3 own the property right now so no
4 one's buying the property.

5 EPA has a lien right to
6 claim recovery costs.

7 MS. SLEZAK: Who would be
8 the seller?

9 MR. LLOYD: They wouldn't --

10 MS. SLEZAK: Who pays the
11 taxes?

12 MR. LLOYD: I don't know.

13 MR. BADALAMENTI: Probably
14 nobody.

15 MS. SLEZAK: Nobody?

16 MR. BADALAMENTI: Probably.

17 MS. SLEZAK: Are taxes
18 accruing, then?

19 MR. BADALAMENTI: You have
20 to ask the municipality that.

21 MS. SLEZAK: Oh, I see.

22 It seems there's a lot of
23 unanswered questions.

24 MR. LLOYD: Probably in the
25 bankruptcy file. It's in the

1 Mattiace Petrochemical
2 bankruptcy court.

3 MS. SLEZAK: And all these
4 millions of dollars are being paid
5 by?

6 MS. WIEDEMER: By TRC. They
7 are the Responsible Party.

8 MS. SLEZAK: "TRC" meaning?

9 MR. LLOYD: The name of the
10 firm.

11 MS. SLEZAK: What does it
12 stand for?

13 MR. LLOYD: It's an acronym.

14 MS. SLEZAK: For?

15 MR. LLOYD: It originally
16 was Travelers Research
17 Corporation, but that was spun
18 off, and TRC is -- you know, it
19 doesn't have an...

20 MS. SLEZAK: So, TRC is
21 paying for it.

22 And you're with TRC?

23 MR. LLOYD: Yes.

24 MS. SLEZAK: What do you
25 plan to do with it after it's

1 Mattiace Petrochemical
2 cleaned up?

3 MR. LLOYD: We do not own
4 the property.

5 (Pause in proceedings)

6 MS. ECHOLS: Ma'am, are you
7 finished?

8 MS. SLEZAK: I want to know
9 what is the future plan for the
10 usage of the property after it is
11 cleaned up.

12 MR. BADALAMENTI: Well, I
13 guess that would depend upon
14 whether all EPA's costs and state
15 costs have been recovered. And at
16 that point in time, probably, if
17 it's cleaned, it will be released
18 and auctioned for sale.

19 MS. SLEZAK: And it would be
20 cleaned up to what level of health
21 acceptability?

22 MR. BADALAMENTI: It will be
23 cleaned up to meet the maximum
24 contaminant levels in the
25 groundwater.

1 Mattiace Petrochemical

2 And the soils have been
3 cleaned up at the surface already,
4 and we'll be addressing some of
5 the subsurface soils.

6 So, it will be -- whatever
7 it's zoned for is what it will be
8 cleaned up to. And I believe it's
9 zoned for --

10 MS. WIEDEMER: It's
11 currently zoned for commercial
12 industrial.

13 MR. BADALAMENTI: So, it
14 would be cleaned up to those
15 levels.

16 MS. SLEZAK: Thank you.

17 MS. ECHOLS: Sir, would you
18 state your name, please?

19 MR. RATASANNO: Gabriel
20 Ratasanno.

21 What is the timeframe for
22 getting it to the level where you
23 want it to be?

24 MR. BADALAMENTI: Well, the
25 active components should take

1 Mattiace Petrochemical
2 place within five to ten years of
3 their start, but there will be a
4 monitoring period that will occur
5 after that point to continue to
6 monitor its effectiveness and drop
7 in levels in the groundwater.

8 MR. RATASANNO: Can we go
9 back to the slide where it shows
10 where the contaminants extended
11 to?

12 MS. WIEDEMER: The contour?

13 MR. RATASANNO: Yes.

14 MS. WIEDEMER: That's only
15 for one contaminant, it's not for
16 all of them.

17 MR. RATASANNO: Okay. So,
18 it's good for one.

19 That's just one contaminant,
20 certainly not all of them?

21 MS. WIEDEMER: Yes, that's
22 just the BTEX.

23 MR. RATASANNO: And this one
24 originated from the Mattiace site.

25 Correct?

1 Mattiace Petrochemical

2 MS. WIEDEMER: Well, you can
3 tell here, basically, where
4 there's these circles, we would
5 assume would be a source area on
6 the property.

7 MR. RATASANNO: And they
8 extended --

9 MS. WIEDEMER: The LNAPL
10 plume that was in the other
11 figures, that is acting as a
12 continuous source for the
13 groundwater.

14 MR. RATASANNO: And that
15 contaminant extends into the
16 neighboring property that's
17 privately owned.

18 Correct?

19 MS. WIEDEMER: Yes.

20 MR. RATASANNO: If you can,
21 go back to the slide where you
22 show where you're going to do the
23 cleanup and the barrier wall.

24 That was fine.

25 MS. WIEDEMER: Okay.

1 Mattiace Petrochemical

2 MR. RATASANNO: I see that
3 you're planning to do all your
4 remediation on the Mattiace site
5 and in the Preserve.

6 MR. BADALAMENTI: Yes.

7 MR. RATASANNO: Nothing on
8 the contiguous neighboring
9 property.

10 Correct?

11 MS. WIEDEMER: Correct.

12 You mean this side?

13 MR. RATASANNO: Yes.

14 MS. WIEDEMER: Yes, this
15 side...

16 MR. RATASANNO: My question
17 is, now that I understand, is that
18 you told me that the private
19 property next to it was
20 contaminated from the Mattiace
21 site and you're going to do
22 remediation only on the Mattiace
23 side.

24 What's going to happen to
25 the private property?

1 Mattiace Petrochemical

2 Who's going to clean that
3 up?

4 MS. WIEDEMER: Contamination
5 found on this side of the property
6 that extended from the Mattiace
7 site through the thermal treatment
8 should treat anything that has
9 went maybe a little bit this way.

10 We did investigate into this
11 property a little bit, but we also
12 are deferring for future
13 investigations to this area,
14 south.

15 MR. RATASANNO: What does
16 that mean?

17 MS. WIEDEMER: It means it's
18 subject to future investigation.
19 We are planning to -- there is
20 contamination found there. We're
21 seeing if there are additional
22 sources that are contributing.

23 MR. RATASANNO: Additional
24 to Mattiace?

25 MR. BADALAMENTI: Yes.

1 Mattiace Petrochemical

2 MR. RATASANNO: And what
3 about the contaminant that came
4 from Mattiace into the private
5 property, who's the Responsible
6 Party for that?

7 MR. BADALAMENTI: That is
8 the subject of future enforcement
9 actions. We know some has left
10 the Mattiace property towards the
11 south and we know there's very
12 good likelihood that there are
13 other sources.

14 So, we're currently
15 gathering information about those
16 other sources, and we will then
17 take an action that will require
18 those responsible to address that
19 area south of Mattiace.

20 MR. RATASANNO: Correct.

21 Now, what about the barrier
22 wall that you are planning to put
23 up, that's going to prevent the
24 private property contaminants to
25 be cleaned up?

1 Mattiace Petrochemical

2 MR. BADALAMENTI: That will
3 prevent any further migration of
4 anything that might possibly leave
5 Mattiace from ever occurring
6 again. So, that will be a
7 barrier.

8 MR. RATASANNO: I
9 understand, but barrier works both
10 ways; it will prevent future
11 contamination, but it probably
12 will prevent the cleanup to be
13 effective next door.

14 Contaminants don't look at
15 property lines. And if you put it
16 on the property line, the
17 contaminants will be locked in to
18 the private property it came from.

19 MR. BADALAMENTI: And the
20 remedy for those areas will have
21 to be evaluated and what
22 alternatives are possible, and
23 then we'll implement something
24 else there.

25 MS. WIEDEMER: Also, it's

1 Mattiace Petrochemical
2 going to be determined during
3 design, I guess, what we're doing
4 first. So, we could potentially
5 be doing the thermal treatment
6 first on the property and then
7 installing the wall and then doing
8 bioventing.

9 So, the wall might not be
10 there. That might be the last
11 step of the process.

12 MR. BADALAMENTI: 85 percent
13 of the problem is to the north and
14 towards the west.

15 MR. RATASANNO: 85 percent.

16 MR. BADALAMENTI: Yes.

17 MR. RATASANNO: Okay. Thank
18 you.

19 MS. WALLER: Gail Waller.

20 How many years ago was the
21 original Record of Decision?

22 MR. BADALAMENTI: Almost 23
23 years.

24 MS. WALLER: So, for 23
25 years -- you found it, it took 23

1 Mattiace Petrochemical
2 years to find out it was
3 ineffective?

4 MR. BADALAMENTI: No, it
5 wasn't implemented 23 years ago.
6 It's been in operation about 15
7 years.

8 MS. WALLER: So, in 15
9 years --

10 MS. WIEDEMER: And it was
11 not ineffective.

12 It's got a pump and treat
13 system that -- when they first
14 start up, they are removing a
15 bunch of contaminants, and then it
16 tends to decline. So, that's what
17 we began to see here.

18 MS. WALLER: Let me ask you,
19 you said with the groundwater,
20 this is not the only source of
21 contamination. You pointed to,
22 this gentleman, that there were
23 other sources of contamination.

24 MS. WIEDEMER: We're looking
25 into whether or not there are --

1 Mattiace Petrochemical

2 MS. WALLER: Going south.

3 Correct?

4 MR. BADALAMENTI: Yes.

5 MS. WALLER: Out of the 150

6 postcards that you sent out to

7 people, how many were sent to

8 Janet Lane, the people who live

9 there?

10 MS. ECHOLS: How many

11 exactly, I don't know. But they

12 were notified about this meeting

13 as well.

14 MS. WALLER: So, I

15 understand you checked the homes,

16 and they're not in the homes;

17 however, they are underneath, the

18 plume.

19 MR. BADALAMENTI: No, the

20 plume is not underneath Janet

21 Lane.

22 MS. WALLER: When I spoke to

23 you on the phone, I asked you and

24 you said it was not in the homes,

25 and I asked what about underneath.

1 Mattiace Petrochemical

2 So, where does it exactly

3 stop from the Garvies Point

4 Preserve to Janet Lane?

5 MR. BADALAMENTI: We'll show

6 you.

7 MS. WIEDEMER: So, this is

8 where the extent of the

9 contamination is north of the

10 divide, and right here is where

11 Janet Lane is.

12 MS. WALLER: How far away is

13 that?

14 MS. WIEDEMER: I mean, if

15 from here to here is seven hundred

16 feet, I'd say four or five hundred

17 feet.

18 MS. WALLER: So, we know

19 that the plume is seven hundred

20 feet going westerly?

21 MR. BADALAMENTI: Yes.

22 MS. WIEDEMER: Yes.

23 MS. WALLER: Okay.

24 MR. BADALAMENTI: And that's

25 occurred over thirty years or

1 Mattiace Petrochemical

2 longer.

3 MS. WALLER: And going
4 north, how far is it in width?

5 MS. WIEDEMER: I don't know.

6 MS. WALLER: So, the
7 groundwater is moving south, in a
8 different direction.

9 MS. WIEDEMER: No.

10 There was a slide that
11 showed there was a divide across
12 the property, a clay divide. So,
13 north of that, the groundwater is
14 flowing in this direction. That's
15 what's causing the plume to extend
16 in that direction.

17 MS. WALLER: Okay.

18 MS. WIEDEMER: And then
19 south of the divide, groundwater
20 is flowing south towards the
21 creek.

22 MS. WALLER: So, I can
23 understand you have a future to
24 decide on things and to implement
25 this.

1 Mattiace Petrochemical

2 How, then, can a development
3 go up without a threat to public
4 safety and health?

5 How do you know with
6 certainty, with somebody about to
7 invest a lot of money down there,
8 that --

9 MS. WIEDEMER: These
10 properties --

11 MS. WALLER: May I finish,
12 please?

13 Who's going to invest a lot
14 of money when you have things that
15 might be, may be, should, type of
16 things?

17 I'm not blaming you for it,
18 but I'm just saying that
19 everything is pretty unknown right
20 now.

21 And, according to Records of
22 Decision on other parcels, you
23 were going to implement one which,
24 you did not chose, on the decision
25 which said no drinking water shall

1 Mattiace Petrochemical
2 ever be used from the aquifer down
3 there, on one of the other parcels
4 across the street.

5 So, I'm trying to figure out
6 why they would even consider
7 cleaning it up to use one of the
8 sources from the groundwater for
9 drinking.

10 MR. BADALAMENTI: Drinking
11 water will be prohibited until the
12 aquifer is restored, and that will
13 be one of the institutional
14 controls that --

15 MS. WALLER: Well, I do
16 understand it's prohibited in one
17 of the other decisions. So was
18 residential. However, that's all
19 been changed.

20 So, how does one then change
21 Records of Decision?

22 When I spoke to you, you
23 said that the last mayor in Glen
24 Cove chose to change it to
25 residential, one of the other

1 Mattiace Petrochemical
2 parcels that are on the way to
3 Mattiace.

4 So, we're sitting here with
5 a parcel of property that's been
6 active with petrochemicals for
7 years and years. And, in my
8 opinion -- by the way, I do
9 believe in phytoremediation
10 because I studied the source of
11 trees and using that to remediate.

12 My concern is that we have
13 people in Garvies Point Preserve
14 right now using it. They're not
15 aware of this. Nobody seems to
16 feel it can be dangerous to them
17 or a contaminant.

18 We have covered meetings
19 down here on parcels somebody's
20 about to invest in, billions of
21 dollars; billions of dollars into
22 something where there is no
23 certainty because nobody knows
24 what the future is; it could be
25 ten years from this, it could be

1 Mattiace Petrochemical
2 another fifteen years for
3 something else.

4 And we have properties that
5 are all contaminated, and it seems
6 to be a hodge-podge of
7 uncertainty; not by your fault, by
8 any means. You have a lot of
9 parcels, so I'm not blaming you
10 per se.

11 I'm just saying there's so
12 much going on there with
13 uncertainty that I don't
14 understand how an investment can
15 go on where nobody knows with
16 certainty about groundwater or
17 drinking water or just
18 contaminants in the air that are
19 down there.

20 I won't go down there, I'll
21 say that much.

22 MR. BADALAMENTI: Drinking
23 water is not impacted because
24 there's no private wells and
25 there's no public wells in that

1 Mattiace Petrochemical
2 direction or in that vicinity.

3 MS. WALLER: And the Records
4 of Decision say drinking water --

5 MR. BADALAMENTI: There is
6 no direct exposure pathway to the
7 groundwater except if somebody is
8 drinking it and puts a well there.

9 Surface soils are not an
10 issue. So, going south, it's an
11 underground groundwater issue.
12 And if drinking water is
13 prohibited, then there's no public
14 health impact.

15 MS. WALLER: I appreciate
16 that and I appreciate you being
17 here; however, my question is if
18 it's taken over twenty years now
19 to get to the point where we
20 are -- and I'm sure it's still
21 there, maybe weakened by the work
22 that you've done -- if it's taken
23 all these years, I don't know how
24 you base a project of this
25 magnitude on...

1 Mattiace Petrochemical

2 I know if I went to buy a
3 house and I knew something was
4 going on to the right, I wouldn't
5 make an investment at that point.

6 But thank you very much.

7 MS. ECHOLS: State your name
8 again, please.

9 MS. SLEZAK: Grace Slezak.

10 I'd like to follow up with
11 that.

12 If the plume and the water
13 is flowing south from the Mattiace
14 property, it seems to me as if it
15 will go right through this
16 proposed development of
17 condominiums.

18 Isn't that correct?

19 MR. BADALAMENTI: The
20 proposed development is not
21 directly south of the site.

22 MS. WIEDEMER: This property
23 and this property are not included
24 in that redevelopment.

25 MS. SLEZAK: A moment ago

1 Mattiace Petrochemical
2 you were showing -- you were
3 showing how it was coming down,
4 which would indicate that would be
5 going right through the potential
6 development.

7 MS. WALLER: Or part of it.

8 UNIDENTIFIED: That's not --

9 (Pause in proceedings)

10 MS. WIEDEMER: So, this is
11 the ferry terminal.

12 MS. SLEZAK: And the creek.

13 So, being that the Mattiace
14 property is outlined in yellow
15 above that and you have the
16 development in between --

17 MS. WIEDEMER: No, this
18 property and this property, so
19 both properties that are to the
20 south, are not included in the
21 redevelopment plan at this time.

22 MS. SLEZAK: Then what are
23 those buildings?

24 MS. WIEDEMER: They are
25 commercial industrial buildings

1 Mattiace Petrochemical

2 The plan right now is for them to
3 stay.

4 MS. SLEZAK: And I doubt if
5 that will last if the developer is
6 going to build the apartment
7 complex a little bit further up.
8 It would make sense for it to be
9 used in the future as a
10 residential development.

11 MR. BADALAMENTI: We can't
12 speak towards the redevelopment
13 plan.

14 MS. ECHOLS: Ma'am?

15 MS. NORMANDIA: Hi. Mary
16 Normandia, Past President North
17 Shore Audubon Society.

18 I just want to make known
19 that there is a big Glen Cove
20 culinary event tonight, so maybe a
21 lot of people are not present and
22 are attending that or I'm sure
23 people would be more concerned
24 with what's going on tonight.

25 I'm wondering -- it looks

1 Mattiace Petrochemical
2 like Garvies Point Preserve was
3 sort of earmarked for all of these
4 testing sites going on and none of
5 the properties to the east of
6 there, as you said, was tested.

7 I'm wondering who chose that
8 particular area for the plume, and
9 did the plume migrate in the
10 fifteen years that you knew it was
11 heading into Garvies Point
12 Preserve or did you just not
13 sample the other spots where the
14 plume also might have been headed?

15 MS. WIEDEMER: We have
16 sampled around this part of the
17 property, and those samples showed
18 that there wasn't contamination.

19 Generally, contamination
20 flows with the groundwater flow,
21 and the groundwater is flowing to
22 the northwest direction. And
23 that's why the plume has extended
24 that far.

25 But, I mean, during the

1 Mattiace Petrochemical
2 original investigation, it was
3 found that contamination was only
4 right off the edge of the
5 property, but at that time I think
6 we didn't fully evaluate it.

7 So, we did have the remedy
8 that was addressing that, and now
9 that's why we went out and further
10 characterized what we have out
11 there, so we can take care of the
12 whole problem.

13 MS. NORMANDIA: So, I'm
14 still not quite clear who would
15 pay for the remediation of this.

16 MS. WIEDEMER: The
17 Responsible Party is paying for
18 it.

19 MS. NORMANDIA: And we don't
20 know who that is.

21 MS. WIEDEMER: The
22 Responsible Party paying for it is
23 TRC Engineers, but they are not --
24 it's complicated.

25 MR. BADALAMENTI: It's like

1 Mattiace Petrochemical
2 an insurance company that decided
3 to pay for damages. That's what I
4 would compare TRC to. The
5 Responsible Parties had sort of
6 like -- something like an
7 insurance policy, and TRC is the
8 insurance policy doing the
9 cleanup.

10 MS. SLEZAK: Who pays the
11 insurance for the insurance
12 company? Who pays the premium?

13 MR. BADALAMENTI: The
14 Responsible Parties.

15 MS. SLEZAK: I love it, I
16 love it.

17 MR. BADALAMENTI: We can
18 refer back to the original Consent
19 Decree and we'll probably have a
20 list of hundreds of companies that
21 are the Responsible Parties or
22 were the Responsible Parties.

23 MS. NORMANDIA: So, it looks
24 like there will be a tremendous
25 amount of upheaval in Garvies

1 Mattiace Petrochemical
2 Point Preserve, which is the only
3 area around there that has trees
4 that are actually part of the
5 plan --

6 MS. WIEDEMER: We met
7 privately with the Preserve about
8 two months ago and discussed, we
9 presented them a similar
10 presentation, and they were
11 onboard with the preferred remedy.

12 MS. NORMANDIA: Would it be
13 about a third of the Preserve,
14 then, that you would have to dig
15 wells or...

16 MR. BADALAMENTI: There's
17 approximately fifteen vertical
18 wells that have to be installed,
19 and that's the extent of it.

20 MS. NORMANDIA: Vertical
21 wells or horizontal wells?

22 MS. WIEDEMER: Vertical
23 wells would be installed on top of
24 the Preserve property, and right
25 now we're thinking about fifteen

1 Mattiace Petrochemical

2 of those.

3 But then the extraction
4 wells -- it's a steep hillside, so
5 the extraction wells will be from
6 the Mattiace property underneath
7 the ground. So, they won't be...

8 MR. BADALAMENTI: The
9 diagram.

10 MS. WIEDEMER: So, these are
11 the vertical wells, so
12 approximately fifteen of those
13 would be installed on the --

14 MS. NORMANDIA: Additionally
15 from the wells that were done for
16 the study itself?

17 MS. WIEDEMER: Yes,
18 additionally there are monitoring
19 wells up there, but those have
20 already been installed as part of
21 this investigation and will stay
22 there.

23 MS. NORMANDIA: So, fifteen
24 additional.

25 MS. WIEDEMER: Yes.

1 Mattiace Petrochemical

2 MS. NORMANDIA: And would
3 there be some -- I saw that there
4 was some mitigation with Garvies
5 at the end --

6 MS. WIEDEMER: Yes, during
7 design, we will work with them and
8 develop a restoration plan. If
9 there are some special tree or
10 shrub is -- you know, there's
11 impacts to those, then the plan
12 will help to restore any damages
13 due to construction.

14 MS. NORMANDIA: And about
15 what's the time limit, the
16 timeframe, on what is taking place
17 here?

18 This is definitely going on,
19 right?

20 This 5B has already been
21 chosen and instituted?

22 MS. WIEDEMER: No.

23 MR. BADALAMENTI: It's our
24 preferred remedy. And depending
25 on public comment tonight, which

1 Mattiace Petrochemical
2 we will take into account -- it
3 probably will be selected, but we
4 want to hear what everybody has to
5 say.

6 MS. NORMANDIA: And the
7 Responsible Party will pay for it.

8 MS. SLEZAK: The mysterious
9 Responsible Party.

10 MS. NORMANDIA: Did you say
11 five years?

12 How long would it take?

13 MS. WIEDEMER: The active
14 components, meaning the bioventing
15 system -- that's the one with the
16 wells or the injections -- they're
17 proposed to be operating for about
18 five to ten years, depending on
19 the results that we see.

20 Then prior to that, I think
21 the first thing we would do is the
22 thermal treatment, and that's only
23 expected to take about a year.

24 So, total active treatment
25 would be about five to ten years,

1 Mattiace Petrochemical
2 and then after that there would be
3 continued monitoring to see the
4 effects of how the active
5 treatment is on the natural
6 degradation process.

7 And if needed, then we might
8 go back, but only with the
9 injections.

10 MS. ECHOLS: Sir?

11 MR. HOWARD: My name is
12 Glenn Howard. I live at 18
13 Southfield Road in Glen Cove. I
14 have several questions.

15 Bring up the map of the
16 site, please.

17 MS. WIEDEMER: This one?

18 MR. HOWARD: I have a very
19 quick question on that.

20 It appears that the plume is
21 running from east to west, but it
22 would seem to me the groundwater
23 would move towards the channel.

24 Is the groundwater actually
25 migrating towards the harbor

1 Mattiace Petrochemical

2 rather than towards the channel?

3 Because at 35 feet above sea
4 level, which is where Mattiace is,
5 you're going under a 70-foot hill
6 and the water stays down and keeps
7 going down and tends to run from a
8 hydraulic high pressure to low
9 pressure.

10 Why isn't it migrating
11 towards the channel and it's
12 migrating in that way?

13 And at the same time, you
14 also indicated in the driveway
15 there between the two buildings,
16 there are sites that might need to
17 be included in the remediation,
18 even though it may be filled in.

19 That's question one.

20 MR. BADALAMENTI: The clay.
21 There's a clay barrier --

22 MR. HOWARD: Ah.

23 MR. BADALAMENTI: -- that's
24 causing it to divide and causing
25 some of the flow, the majority of

1 Mattiace Petrochemical

2 the flow --

3 MR. HOWARD: It's holding
4 the water at that level and moving
5 it that way, and, also, apparently
6 keeping it from migrating very
7 rapidly. That's good.

8 MR. BADALAMENTI: Yes.

9 MR. HOWARD: So, when you
10 put your wells in and draw the
11 water from the remediation wells
12 onsite, then you'll be pulling
13 water back towards the site and
14 the site should shrink.

15 Is that correct?

16 MR. BADALAMENTI: Right.

17 But that's part of the
18 existing remedy, the groundwater
19 pumping. The future remedy that
20 we're proposing here does not
21 include groundwater pumping.

22 MR. HOWARD: Now, when you
23 talk about phytoremediation, what
24 do you mean in 25 words or less?

25 MR. BADALAMENTI: We mean

1 Mattiace Petrochemical

2 the --

3 MR. HOWARD: As I understand
4 what you're talking about --

5 MR. BADALAMENTI: We mean
6 the degradation --

7 MR. HOWARD: You used the
8 word "phytoremediation" in one of
9 your slides. That means to me --
10 I don't see how these things can
11 be phytoremediated because I'm not
12 sure of many microorganisms that
13 can digest them.

14 I assume that the
15 phytoremediation needs high energy
16 ultraviolet light to treat the
17 problem.

18 MR. BADALAMENTI: We are
19 using the bacteria that are
20 breaking down --

21 MR. HOWARD: That's
22 trichloroethylene and vinyl
23 chloride?

24 MR. BADALAMENTI: Yes.

25 We have a chemical reaction

1 Mattiace Petrochemical
2 we can show you, how it breaks
3 down.

4 MR. HOWARD: Okay.

5 MR. BADALAMENTI: So, the --

6 MR. HOWARD: I know a site
7 in Ann Arbor where they have a
8 similar problem, and they bring
9 material to a holding pond with
10 oxygen in it and hold it to the
11 high energy UV light to destroy
12 all the VOCs and come out with
13 water better than drinking water.

14 MR. BADALAMENTI: That's
15 another method. Costly.

16 MR. HOWARD: Is this
17 Alternative 5 the best method or
18 the fastest method?

19 MR. BADALAMENTI: We think
20 so. We're hitting it with several
21 different methods and targeting
22 the technology to where it's most
23 effective.

24 The higher concentration hot
25 spots, we're going to deal with

1 Mattiace Petrochemical
2 with the thermal treatment, and
3 that will quickly eliminate that
4 source. And the NAPL, we're going
5 to address that with the
6 bioventing. And the groundwater
7 we'll address with nutrients and
8 bacterial additions, if necessary;
9 pH adjustments, if necessary; or
10 food additions, if necessary.

11 MR. HOWARD: And the air
12 stripping.

13 MS. WIEDEMER: No.

14 MR. BADALAMENTI: There's no
15 air stripping. We're not using
16 air sparging.

17 MR. HOWARD: Okay.

18 The gentleman asked a
19 question about the surrounding
20 sites. But I notice that you have
21 monitoring wells, and none of
22 those seem to have picked up any
23 of this particular plume.

24 Is that correct?

25 Because on the map, you have

1 Mattiace Petrochemical
2 the wells marked and they're
3 outside the yellow area and those
4 are monitoring wells.

5 So, I'm assuming you're
6 saying what you have found is
7 within the yellow area and only
8 within the yellow area.

9 MR. BADALAMENTI: Right,
10 those wells were installed to
11 delineate where "clean" starts.

12 MR. HOWARD: And somebody
13 asked a question about uses future
14 on, but I know even on the photos
15 for this site and Columbian Carbon
16 Ribbon, whatever you want to call
17 it, Powers Chem Co., the basic
18 application was to clean it and
19 then monitor for at least a year
20 to make sure that the cleanup is
21 holding, and then it could be
22 certified for whatever level we
23 want it to.

24 That's what you do, right?

25 MR. BADALAMENTI: Yes.

1 Mattiace Petrochemical

2 MR. HOWARD: You could
3 certify it for commercial or
4 residential, depending.

5 MR. BADALAMENTI: We have a
6 normal five-year review process,
7 where we do evaluate the site
8 thoroughly to see how effective
9 the remedy was.

10 But we do plan to
11 continually monitor the system and
12 adjust and tweak it.

13 MR. HOWARD: Finally, are
14 you able to give a better estimate
15 of timeline?

16 After you see a year or so
17 of what can actually be done with
18 the process you're using, is what
19 I meant. I'm not asking for
20 specific numbers.

21 MR. BADALAMENTI: I think
22 after a period of five to ten
23 years we'll have a very good idea
24 of where the end point is going to
25 be.

1 Mattiace Petrochemical

2 MR. HOWARD: Okay. Thank
3 you.

4 MS. ECHOLS: Your name
5 again, please?

6 MS. NORMANDIA: Mary
7 Normandia.

8 The wells that Glenn just
9 asked about outside the yellow
10 lines there, did you say that they
11 were tested and nothing was found
12 in them or they were not tested?

13 MR. BADALAMENTI: Any well
14 that's been installed has been
15 tested, sampled.

16 MS. NORMANDIA: In this
17 particular 2011 to '13 study, the
18 wells that were installed prior,
19 the test wells prior, which are
20 noticeable all around the
21 entire -- I don't know,
22 development area, were those at
23 all tested, since they're already
24 there and open to testing?

25 Did anyone go in there and

1 Mattiace Petrochemical

2 do what you do in a well?

3 MR. BADALAMENTI: I can't
4 answer you exactly which wells
5 were sampled and which wells we're
6 talking about, but if the wells
7 were installed, at one point they
8 were sampled and that data and
9 information was used.

10 I thought he was referring
11 to wells that were recently
12 installed that are outside the
13 yellow barrier. Those would be
14 indicative of the clean area and
15 define where the plume is.

16 That's how we define and
17 delineate the plume. We keep
18 going until we find clean.

19 MS. WIEDEMER: That's just
20 for this area.

21 MS. NORMANDIA: You didn't
22 go to the 1989 wells and check
23 those?

24 MS. WIEDEMER: No.

25 MR. BADALAMENTI: Did that

1 Mattiace Petrochemical

2 answer your question? No.

3 MS. WIEDEMER: Are you
4 talking about to the south or
5 anywhere outside the yellow?

6 MS. NORMANDIA: To the south
7 and to the east, there are
8 existing wells from the original
9 survey.

10 MS. WIEDEMER: All those
11 were samples, and particularly the
12 ones to the south, down, like, the
13 driveway, contamination was found.
14 But, like we said, we are
15 investigating if there are
16 additional sources or not.

17 MS. NORMANDIA: But not as
18 far as, say, Captain's Cove.
19 Those wells were not tested in
20 this particular...

21 MS. WIEDEMER: No.

22 We don't expect groundwater
23 to be flowing in that direction.
24 So, if contamination was found, it
25 would likely not be from Mattiace.

1 Mattiace Petrochemical

2 MS. NORMANDIA: I'm really
3 happy and I think it's great that
4 this does get cleaned up.

5 When you empty out the
6 volatile carcinogenic substances,
7 does it become airborne?

8 Is it underground and
9 relatively safe to humans now, and
10 then when you pull it up is there
11 some exposure level that we should
12 be concerned about?

13 How does that dissipate?

14 MR. BADALAMENTI: Whatever
15 we start in motion, we have a
16 collection system that's also
17 collecting. So, there will be a
18 vacuum --

19 MS. WIEDEMER: Underground.

20 MR. BADALAMENTI: Yes,
21 underground.

22 -- that will capture the
23 vapors, bring it back to the
24 treatment building, and it will be
25 treated through activated carbon

1 Mattiace Petrochemical
2 or something else.

3 MS. NORMANDIA: And the
4 treatment building will be an
5 onsite facility?

6 MR. BADALAMENTI: It exists.
7 It's already there.

8 MS. WIEDEMER: That right
9 there, that's the current
10 treatment building. That's there.

11 MS. WALLER: I have a
12 question again.

13 Isn't this more when it goes
14 airborne and depletes in the water
15 and gets less and less and less,
16 isn't it less dangerous if you
17 don't put up a building?

18 Isn't it more dangerous when
19 you start putting up buildings and
20 things, these contaminants, and
21 that's why you monitor soil vapor?

22 MR. BADALAMENTI: We don't
23 intend to release contaminants
24 into the air.

25 MS. WALLER: I mean, when

1 Mattiace Petrochemical
2 it's airborne and becomes weaker
3 and weaker, isn't it more
4 dangerous, like Knob Hill and
5 things like that?

6 Once there's a building up,
7 isn't it more dangerous when the
8 building is up?

9 MR. BADALAMENTI: That's
10 what we mean by the term "vapor
11 intrusion". If there's vapors in
12 the ground and they collect under
13 the slab of the building, they can
14 sometimes penetrate through cracks
15 of the building and enter into
16 indoor air. That's the process of
17 vapor intrusion into a home, which
18 we are concerned about.

19 So, if there's any
20 structures built over the plume in
21 the future, we would certainly
22 want to see testing for the
23 possibility of vapor intrusion.

24 MS. WALLER: Thank you.

25 MS. SLEZAK: If building is

1 Mattiace Petrochemical
2 eventually done on a property that
3 had been contaminated and is
4 cleaned up to whatever acceptable
5 level there is, in the process of
6 construction, as they're drilling
7 into pilings and the whole
8 construction process, wouldn't
9 that, again, reignite, for lack of
10 a better word, all the
11 contaminants to resurface in some
12 form?

13 MR. BADALAMENTI: There's
14 certainly some procedures that
15 will have to be taken during
16 construction of any building --

17 MS. SLEZAK: On any
18 contaminated site.

19 MR. BADALAMENTI: Air
20 monitoring, perimeter monitoring,
21 to make sure that any dust or
22 vapors that are created do not
23 extend into residential areas
24 would have to take place.

25 And if there's any

1 Mattiace Petrochemical
2 violations of that, then
3 construction might have to be
4 modified or slowed down or some
5 other procedures put in place so
6 that that does not occur.

7 MS. SLEZAK: May I ask about
8 the lot numbers, the section,
9 block, and lot numbers for all the
10 parcels that actually comprise
11 this particular parcel and its
12 plume?

13 MR. BADALAMENTI: We should
14 have that. The Mattiace property,
15 I'm sure, has its tax and block
16 numbers. It should be on the tax
17 map.

18 MS. SLEZAK: Okay. Thank
19 you.

20 MS. ECHOLS: Yes, sir?

21 MR. RATASANNO: I have two
22 questions.

23 The yellow area intruding
24 into Garvies Point, people who
25 walk their kids and dogs and walk

1 Mattiace Petrochemical
2 over this plume, will they be in
3 any kind of danger?

4 MR. BADALAMENTI: The
5 groundwater is at least thirty-,
6 forty-feet deep in the Preserve
7 area?

8 MR. LLOYD: You're talking
9 about 65 to 70 feet below grade.
10 There's no risk to anyone. We
11 evaluated those issues in the
12 health risk assessment. It's not
13 an issue for anyone.

14 Related to the other
15 comments about it, the reason for
16 the horizontal wells is to
17 minimize disturbance up there. As
18 Sal previously pointed out, the
19 surface soils are clean, there's
20 no issues.

21 Because it's a hillside and
22 because of the clay, it caused it
23 to move to the west, but it's 65,
24 70 feet below the surface.

25 MR. RATASANNO: Thank you.

1 Mattiace Petrochemical

2 And the other question is
3 you referred a few times about
4 other source of contaminants right
5 next door.

6 How do you determine that
7 and how do you investigate that?

8 MR. BADALAMENTI: Well,
9 we've taken a lot of samples down
10 along that driveway between the
11 Mattiace property and those two
12 buildings, and we can just see
13 from the concentration contours
14 that there's some contribution
15 from other areas, other than
16 Mattiace.

17 MR. RATASANNO: I see.

18 MR. BADALAMENTI: The extent
19 to which each part is responsible,
20 we'll have to work it out.

21 MS. WALLER: What other
22 areas?

23 What are they?

24 MR. BADALAMENTI: It looks
25 like the 1 Garvies Point building

1 Mattiace Petrochemical
2 and 2030 Garvies Point Building,
3 that vicinity.

4 MS. WALLER: What is that,
5 2030?

6 MS. ECHOLS: Can you show
7 her?

8 MS. WIEDEMER: So, here was
9 where that groundwater divide was
10 and this was where the plume that
11 we were addressing, under this.

12 So, as you can see, we did
13 investigate down the driveway, but
14 here it seemed to be that there
15 could possibly be a source. So,
16 that's what we're investigating,
17 down in that area, to see if
18 any --

19 MS. WALLER: What's that
20 address there?

21 MS. WIEDEMER: The address,
22 it's 1 Garvies Point and 2030
23 Garvies Point.

24 MS. WALLER: Okay. Thank
25 you.

1 Mattiace Petrochemical

2 MR. RATASANNO: I lost my
3 train of thought, I'm sorry.

4 MS. NORMANDIA: I guess
5 there was no testing done under
6 2030 because it seems like it
7 would be pretty likely that there
8 would be something going on there,
9 even though the water --

10 MS. WIEDEMER: About ten
11 years ago, we did do vapor
12 intrusion testing in these
13 buildings. 1 Garvies Point --
14 well, both of them and subslab had
15 elevated levels. So, then we had
16 to go back in and check the indoor
17 air.

18 As a result of that, 1
19 Garvies Point did install a
20 mitigation system on their own.
21 Unfortunately, 2030 would not
22 allow us access back to sample
23 indoor, so that's going to be
24 something that we'll have to work
25 for, to gain access to that

1 Mattiace Petrochemical
2 property in order to investigate
3 further.

4 MR. RATASANNO: What is the
5 contaminant?

6 Where is it coming from?

7 MS. WIEDEMER: Where is it
8 coming from?

9 MR. RATASANNO: Yes.
10 What produces it?

11 MS. WIEDEMER: It was in the
12 chemicals that they used during --
13 it could be cleaning solvents
14 or -- I don't know what else.

15 MS. OLSEN: Degreasers.

16 MR. BADALAMENTI: Yes,
17 degreasers.

18 MR. RATASANNO: What does it
19 do to the human body?

20 MS. OLSEN: It varies with
21 the individual chemicals, and
22 that's why we use a Risk
23 Assessment, to look at what the
24 potential risks are from exposure.

25 We look at exposures to

1 Mattiace Petrochemical
2 young children, adolescents,
3 adults, and we also look at worker
4 exposure, potentially, at the
5 site.

6 So, some of these chemicals
7 are classified based on their
8 carcinogenicity and other impacts,
9 such as impact on the liver or
10 kidney.

11 But the approach that EPA
12 uses is designed to be very
13 protective. So, we may see an
14 effect in a study, but we're
15 looking at levels far below that
16 as our point where it becomes
17 significant for our Risk
18 Assessment.

19 MR. RATASANNO: So, the
20 people working in this building
21 right now, are they at risk?

22 MS. OLSEN: Because of the
23 vapor mitigation, we have
24 recommended --

25 Am I correct in remembering

1 Mattiace Petrochemical
2 this, we had recommended a vapor
3 mitigation system?

4 MS. WIEDEMER: 1 Garvies
5 Point, I believe just this
6 building, not this building, has a
7 vapor mitigation system already
8 installed.

9 MR. RATASANNO: I know that.
10 But 2030 does not.

11 MS. WIEDEMER: 2030 does
12 not. We have not been allowed
13 access into that to sample
14 further.

15 So, at this time, we can't
16 really comment.

17 MR. RATASANNO: Could the
18 people working there be at risk?

19 MS. OLSEN: Depending upon
20 where they're located, where our
21 samples were located.

22 And we're also looking at
23 exposure for workers of 25 years.
24 So, the exposure at this point is
25 much less than this period of

1 Mattiace Petrochemical
2 time.

3 How many days per week that
4 individual works there, those are
5 all things that would need to be
6 considered to answer your
7 question.

8 MS. WALLER: Are you done?

9 MR. RATASANNO: One last
10 question.

11 Is this particular
12 chlorinated VOC, is this a
13 carcinogen?

14 MS. OLSEN: Some of them
15 are.

16 For example, benzene is a
17 known human carcinogen,
18 trichloroethylene has just been
19 categorized in that category.
20 Others are what are considered
21 probable or possible.

22 So, there are different
23 classifications depending what
24 chemical they are.

25 But we also look at not just

1 Mattiace Petrochemical
2 classification, but also how
3 strong a chemical it is. And
4 that's how we look at the risk
5 assessment.

6 We're looking at the
7 toxicity, and that's based on, in
8 many cases, animal studies or
9 human studies that are available,
10 and, also, the exposure; how many
11 days per week for how many years
12 is an individual exposed.

13 Combining those two
14 together, we develop a cancer risk
15 and a noncancer hazard, and that's
16 what informs our recommendation.

17 MR. RATASANNO: Thank you.

18 MS. WALLER: So, in other
19 words, that's basically depending,
20 as you said, on how long somebody
21 is there and how many days a week,
22 which would be reason not to make
23 it residential because the person
24 spends more time there.

25 However, the Knob Hill site,

1 Mattiace Petrochemical
2 which was perc, cleaning fluid,
3 which we just had a thing on, we
4 did our own study because they
5 said there's a threat to human
6 health right now for liver cancer
7 and thyroid disease, which I have
8 now and 25 others of us; four or
9 five have thyroid cancer in very
10 close proximity.

11 So, perc, they said, at Knob
12 Hill, liver cancer and thyroid
13 disease.

14 MS. OLSEN: I would look
15 back at the studies because --
16 those are on the web page, and I'd
17 like to take a look at it because
18 it's a very broad history of that
19 chemical.

20 So, we will put that
21 information in the ROD.

22 MS. WALLER: I'm concerned
23 because it's the same chemical.
24 And even though they've been
25 treating that since the Record of

1 Mattiace Petrochemical
2 Decision, it's now spread to
3 Stewart Drive, Piano Exchange, all
4 over. And it's weakened where it
5 is onsite with the soil monitoring
6 equipment.

7 However, there's a lot of
8 monitoring equipment up Bryce
9 Avenue; it's weaker there, but the
10 plume keeps spreading. It's
11 weaker airborne towards the water,
12 as they say.

13 My concern is the fact that
14 we have such a huge amount by
15 where I live, there's a child with
16 Hashimoto's disease, thyroid
17 cancer, liver cancer. It's a huge
18 amount.

19 We don't know with
20 certainty, but I believe that's
21 some of the problems that could
22 occur from perc.

23 MS. OLSEN: I will go back
24 and check specifically on that.

25 MS. WALLER: Thank you.

1 Mattiace Petrochemical

2 MS. OLSEN: Again, there's
3 also the question of what is the
4 exposure and --

5 MS. WALLER: It's the Knob
6 Hill site, which is now Payless
7 Shoes, which we just had a meeting
8 on. That's New York State DEC;
9 Lincoln Putnam, I think it was.

10 MS. OLSEN: It would have to
11 be evaluated based on what
12 information they have --

13 MS. WALLER: But that's
14 twenty years, and we're still
15 going with another Record of
16 Decision, so I don't know if you
17 can clean this up to any
18 specification that we know of.

19 MS. OLSEN: New York State
20 has its own approach for doing the
21 evaluation and for looking at
22 toxicity, so we can put you in
23 contact with New York State.

24 MS. WALLER: No, I've been
25 in contact. Been there.

1 Mattiace Petrochemical

2 MS. ECHOLS: Ma'am?

3 MS. NORMANDIA: Mary

4 Normandia.

5 Ashley, could you go to the
6 cost comparison table on the
7 Powerpoint sheet?

8 The titles of the columns
9 are not listed here.

10 MS. WIEDEMER: Capital cost,
11 operation and maintenance cost,
12 and then present worth.

13 MS. NORMANDIA: Who finally
14 determines, you or -- you are
15 suggesting one option.

16 Who makes the final
17 determination?

18 MS. WIEDEMER: EPA.

19 MS. NORMANDIA: And then
20 they bill who?

21 MS. WIEDEMER: The
22 Responsible Party.

23 MS. NORMANDIA: As a
24 taxpayer, I'm a little concerned.

25 MR. LLOYD: The Responsible

1 Mattiace Petrochemical

2 Party pays for EPA too.

3 MS. WALLER: And our dinner
4 tonight.

5 MS. ECHOLS: Do we have any
6 more questions for the Mattiace
7 site?

8 MR. HOWARD: These are all
9 very dense compounds compared to
10 water. And they're insoluble,
11 basically, so they sink. So, they
12 sit at the water table or in the
13 water table, they don't sit at the
14 surface of the land.

15 So, how far down is the
16 water table at this point at the
17 Mattiace site?

18 I notice the driveway's
19 running roughly a little under ten
20 feet, maybe twenty. But the
21 Mattiace site is at 35 feet, and
22 the water table must be
23 significantly below that. So,
24 it's not even near the surface.

25 And these materials being

1 Mattiace Petrochemical
2 dense would tend to stay down in
3 the water, not migrate, unless you
4 have volcanic action, which you
5 don't.

6 MR. BADALAMENTI: They're
7 floating on the water table.

8 MR. HOWARD: Is that
9 basically an accurate statement?

10 MR. BADALAMENTI: Yes.

11 MR. HOWARD: Okay.

12 MR. BADALAMENTI: I think we
13 have a graphic of the groundwater
14 elevations. It's in the Remedial
15 Investigation report.

16 About thirty feet.

17 MR. HOWARD: So, they're not
18 as close as the -- they're closer
19 than the Photo Circus site, but
20 still well below the surface, out
21 of range, unless somebody wants to
22 dig a 30-foot hole.

23 MR. BADALAMENTI: And deeper
24 yet out in the preserve.

25 MR. HOWARD: Okay. Thanks.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

MS. ECHOLS: Any more
questions?

Okay. I'd like to thank
everyone for coming out. All of
your comments and concerns, we
will bring them all back to the
Region, Ashley will put together
the Responsiveness Summary and it
will be sent to the Regional
Administrator, and the decision
will be made taking into
consideration everything that was
said tonight.

Thank you for coming out.

(Time noted: 8:22 p.m.)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

C E R T I F I C A T E

STATE OF NEW YORK)

) ss.

COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR,
CCR, a Shorthand (Stenotype)
Reporter and Notary Public of the
State of New York, do hereby certify
that the foregoing transcription of
the Public Meeting held at the time
and place aforesaid is a true and
correct transcription of my
shorthand notes.

I further certify that I am
neither counsel for nor related to
any party to said action, nor in any
way interested in the result or
outcome thereof.

IN WITNESS WHEREOF, I have
hereunto set my hand this 5th day of
May, 2014.

LINDA A. MARINO, RPR, CCR

Attachment 5

Written Comments Submitted During Public Comment Period



41 Spring Street
New Providence, NJ 07974

908.988.1700 PHONE
973.564.6442 FAX

www.trcsolutions.com

Marc S. Faecher
Senior Vice President

Phone: 908-988-1688
Email: mfaecher@trcsolutions.com

May 19, 2014

Via E-Mail and Overnight Delivery

Ashley Wiedemer
Remedial Project Manager
U.S. Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, NY 10007

Re: Public Comments on the Proposed Remedial Plan for the
Mattiace Petrochemical Co., Inc. Superfund Site, Glen Cove, New York

Dear Ms. Wiedemer:

TRC Environmental Corporation (“TRC”) welcomes the opportunity to submit these comments on the April 17, 2014 Proposed Remedial Plan (“Proposed Plan”) prepared by the U.S. Environmental Protection Agency (“EPA” or “the Agency”) for the Mattiace Petrochemical Co., Inc. Site in Glen Cove, New York (the “Site”). As the sole party performing the existing remedy and preparing the Supplemental Remedial Investigation/Feasibility Study (“SRI/SFS”) for the Site on behalf of the Responsible Parties, TRC has a comprehensive and highly informed understanding of Site conditions and the remedial alternatives under consideration by EPA for selection of a modified final remedy for the Site. The purpose of this Proposed Plan is to select a final remedy for the Site to replace the original remedy (groundwater extraction and treatment along with soil vapor extraction and treatment) selected in the 1991 Record of Decision (ROD) which after numerous years of operation was determined during the most recent Five-year Review to be ineffective in achieving the 1991 ROD Remedial Action Objectives.

TRC has carefully evaluated the Proposed Plan and the rationale set forth in it for EPA’s proposed “Preferred Alternative” (Alternative 5b), which consists of Bioremediation of LNAPL through Bioventing and Enhanced Bioremediation of Groundwater, In-Situ Thermal Treatment of Soil and Groundwater Hot Spots, Partial Vertical Containment, and Hydraulic Control via Phytoremediation and Monitored Natural Attenuation (“MNA”). Due to the extensive scope, cost and effectiveness of the Preferred Alternative in removing residual contaminant mass from the Site, EPA should clarify that the use of MNA following active remediation is not restricted to any particular time frame (particularly if EPA elects to include a

R2-0005118

Remedial Action Objective tied to the achievement of Maximum Contaminant Levels “MCLs”, which, as stated below, is inconsistent with the NCP under the circumstances presented here). This recommendation is further supported by documented evidence in the SRI Report (Sections 4.4.11 Geochemical Parameters, 4.6.3 In-Situ Biodegradation, and 6.3.4 Distribution and Fate and Transport of COPCs in Groundwater) of Site conditions that are clearly conducive to additional degradation as evidenced by the significant ongoing breakdown of contaminants of concern that is occurring in the groundwater at the Site.

In addition to TRC’s comments above regarding the remedy selected in the Proposed Plan, we offer the following suggested changes to specific statements in the Proposed Plan which are further detailed below in the order they appear in the Proposed Plan:

On Page 3 in the second paragraph, EPA states that “[t]he 1989 RI identified soil and groundwater contamination at the former Mattiace Property, and sediment contamination in nearby Glen Cove Creek.” This statement should be clarified based on the information contained in that document and the summary of this information on page 1-14 of the SRI Report, which states that the sediment contamination identified in Glen Cove Creek was not determined to be attributable to the Mattiace Site as there was similar contamination identified at both upstream and downstream locations in the Creek from the Site.

On Page 6 in the second paragraph under the section entitled “North of the Divide,” EPA concludes in the last sentence that VOC contamination in groundwater identified north of the clay mound and moving towards the west is “broadening the plume out to the south.” This conclusion should be deleted as it contradicts conclusions on page 3-8 and groundwater flow patterns shown on Figures 3-10 and 3-11 of the SRI/SFS documents concerning groundwater flow direction and plume conditions north of the groundwater divide. The data in these documents clearly show that the groundwater and plume is moving in a westerly or northwesterly direction north of the clay mound, and thus do not in fact impact the plume towards the south.

On Page 10 under the section entitled “Remedial Action Objectives,” EPA identifies the third remedial action objective as “Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and State MCLs on the former Mattiace Property and north of the groundwater divide”. With respect to this objective, the following considerations, which individually and collectively make use of the referenced groundwater as a source of drinking water in both the short and long term remote and highly unlikely, should be considered in determining whether EPA establishes restoring groundwater in the shallow surficial aquifer to Safe Drinking Water Act Maximum Contaminant Levels (“MCLs”) as a Remedial Action Objective as well as the amount of time considered reasonable for restoration of groundwater.



- As discussed on page 12 of the Proposed Plan, EPA acknowledges that existing laws and regulations (NY ECL 15-527) are in place that prevent the present and reasonably foreseeable use of groundwater as a source of drinking water in this general area.
- The overall quality of the groundwater beneath the Site has been, and will continue to be further degraded by urban activities, such as road salting in the winter, unrelated to historical activities on the Mattiace property.
- The groundwater yield is very limited at the Site (only one well of the 13 existing extraction wells in the shallow surficial aquifer yields more than 0.5 gpm and that 6 inch well yields ~ 3 gpm maximum and is located in the Garvies Point Preserve Area), such that the shallow groundwater does not constitute a viable water supply source.
- Even if the groundwater beneath the Site could be extracted in a manner that could provide a sufficient yield to be considered a viable water supply, its proximity to the adjacent Bay and limited hydraulic flux as shown in the Groundwater Modeling report contained in Appendix D of the SRI Report would result in salt water intrusion if the groundwater was actively pumped. Such extraction would similarly render the shallow groundwater in the area unusable in both the short and long-term.

Given these factors, and because EPA has selected a proposed remedial alternative (In-Situ Thermal Treatment) that will more rapidly reduce the highest contaminant concentrations at significantly greater cost when compared to other remedial alternatives that have been determined to be protective of human health and the environment (e.g. Alternative 4d), a Remedial Action Objective designed to achieve a goal of restoration of groundwater to MCLs is unwarranted as there are neither demonstrable means nor plans for shorter or intermediate term need for use of the groundwater. Additionally, given the current and reasonably anticipated lack of groundwater use for drinking water in the area at issue, and the condition of the shallow groundwater in the area of the Site attributable to sources other than the Site, at a minimum EPA should defer evaluating whether achievement of MCLs (while desirable) is actually viable, or necessary, until after the remedy is implemented and sufficient time has elapsed to examine its effectiveness.

On Page 15 under the section summarizing Alternative 5b, EPA states that “[t]he existing groundwater extraction and treatment system would be restarted if the hydraulic control of groundwater migration to the northwest is necessary or if water levels behind the partial vertical barrier are not maintained through the tree root systems.” During the development of the SRI/SFS, TRC and EPA addressed this very issue (i.e. the potential for significant mounding of groundwater behind the partial vertical barrier and the effectiveness of the phytoremediation system in controlling groundwater levels). During those discussions, several options other

than re-starting the existing extraction and treatment system were presented as being viable alternatives for hydraulic control including capping the area to reduce infiltration and installation of a french drain to route groundwater flow through the clay mound to the northwest. In those discussions, EPA agreed that should such a hydraulic control issue arise, TRC would evaluate various approaches and propose to EPA appropriate actions to address the issue. While one option could include re-starting the system, other viable remedial options clearly exist and should be evaluated at the time based on all information then known about the Site. EPA should modify this discussion in the final Remedial Plan to provide for an evaluation of technically feasible and effective alternatives if and when conditions mandate further action to address hydraulic control.

On Page 19 under the section describing the Preferred Remedy (Alternative 5b), EPA states in the last paragraph that “[t]he enhanced reductive bioremediation system, consisting of vertical injection wells, would be constructed both on the former Mattiace Property where thermal treatment would not address contamination and in the NCGPP areas where elevated concentrations of COC VOCs have been detected in groundwater.” This statement is inconsistent with the description of Alternative 5b in the SFS, which proposed the use of enhanced reductive bioremediation system on the NCGPP property, but contemplated In-Situ thermal treatment for soils and groundwater in the Mattiace Property. EPA should clarify that the use of the biological approach in isolated locations on the Mattiace Property represents a contingent remedy solely to the extent it is determined to be necessary at some future time to address residual groundwater impacts that are not being adequately reduced by natural attenuation processes.

On Page 20 EPA states that “[t]he environmental benefits of the preferred remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2’s Clean and Green Energy Policy and NYSDEC’s Green Remediation Policy 13. This would include consideration of green remediation technologies and practices.” Given that this issue was not discussed in the SFS, it is TRC’s understanding that this language was included as a generic evaluation requirement, and not a requirement for specific actions at the Site under the planned remedial action. We further note that the selected remedial alternative, which includes the use of Phytoremediation and In-Situ technologies, already represents a far more sustainable remedy than the inefficient extraction remedy that it replaces.

On Page 20 EPA states that “[a] long-term groundwater and surface water monitoring program would be developed and implemented to track and monitor changes in the groundwater contamination.” As set forth in the SFS description of the Remedial Alternatives, any surface water monitoring was to be restricted to monitoring surface water runoff during remedial construction activities, and would not extend to sampling of adjacent surface water bodies, which is not a consideration in the SFS. Therefore, the final Remedial Plan should exclude any

Ms. Wiedemer
USEPA
May 19, 2014
Page: 5

reference to a surface water monitoring program except one related to monitoring surface waste runoff during remedial construction activities. EPA has provided no rationale as to why any ongoing post-remedial construction surface water monitoring program is necessary and, should EPA now believe one is necessary despite the lack of reference to it in the EPA-approved SFS, no opportunity for public comment on any such rationale has been provided. If EPA believes an ongoing surface water monitoring program is necessary to protect human health or the environment, the Agency needs to set forth the rationale for any such conclusion and afford the public a reasonable opportunity to comment on it.

TRC requests that EPA give careful consideration to these comments and include them in the administrative record for the Site. Any questions that EPA may have regarding these comments, and any request for further information, may be directed to the undersigned.

Sincerely,

TRC ENVIRONMENTAL CORP.



Marc Faecher
Senior Vice President

cc: Karl Bourdeau, Esq., Beveridge & Diamond PC
Raymond R. Boyd, P.E., Vice President TRC
(All of the above via Email only)



R2-0005122